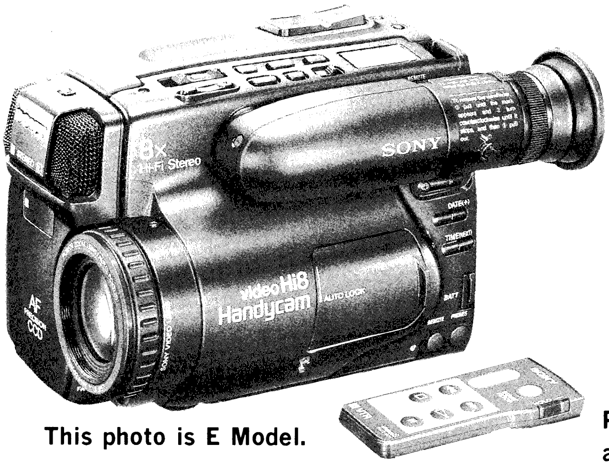
CCD-TR705E
RMT-504

SERVICE MANUAL

AEP Model
UK Model
E Model
Australian Model



This photo is E Model.

Remote commander is available as a unit.

video Hi8
Handycam

FL MECHANISM

For MECHANISM ADJUSTMENTS, refer to the "8mm Video MECHANICAL ADJUSTMENT MANUAL II" (9-972-705-11).

SPECIFICATIONS

System

Video recording system	Four Rotary heads, Helical scanning FM system
Audio recording system	Four Rotary heads, Helical scanning FM system
Video signal	PAL color, CCIR standards
Usable cassette	8 mm video format cassette (Hi8 or Standard 8 mm)
Tape speed	SP mode: Approx. 20.051 mm/sec (13/16 in)/sec. LP mode: Approx. 10.058 mm/sec (13/32 in)/sec.
Recording time	SP mode: 1 hour and 30 minutes (E5/P5-90) LP mode: 3 hours (E5/P5-90)
Playback time	SP mode: 1 hour and 30 minutes (E5/P5-90) LP mode: 3 hours (E5/P5-90)
Fast-forward/rewind time	Approx. 8.5 min. (E5/P5-90)
Image device	CCD (Charge Coupled Device)
Viewfinder	Electronic viewfinder (black and white)
Lens	Combined 8 x power zoom lens f= 7.8 — 62.4 mm (5/16 to 2 1/2 inches), F= 1.6 — 2.2 37 mm (1 1/2 inches)
Auto focus system	TTL autofocus system inner focus wide macro system
Color temperature	Automatic, HOLD, 💡 (indoor) 3,200 K ☀ (outdoor) 5,800 K
Minimum illumination	2 lux (F 1.6)
Illumination range	2 lux — 100,000 lux
Recommended illumination	More than 100 lux
Aperture correction	Automatic

Input and output connector

S video input/output (AEP/UK model: Output only)	4-pin mini-DIN Luminance signal: 1 Vp-p, 75 ohms, unbalanced, sync negative Chrominance signal: 0.3 Vp-p 75 ohms, unbalanced
Video input/output (AEP/UK model: Output only)	Phono jack, 1 Vp-p, 75 ohms unbalanced sync negative

—continued on next page—

MICROFILM

Hi8 VIDEO CAMERA RECORDER

SONY®

Audio input/output (AEP/UK model: Output only)	Phono jacks Input: –7.5 dBs, input impedance more than 47 kilohms Output: –7.5 dBs, (at output impedance 47 kilohms) impedance less than 2.2 kilohms
DC OUT	Special minijack, DC 5 V
Headphones jack	Stereo minijack
Remote jack	Stereo mini-minijack
MIC jack	Stereo minijack, –66 dBs, low impedance with 2.5 — 3 V DC output, impedance 6.8 kilohms

General

Power requirements	On battery mounting surface 6.0 V (battery pack) 7.5 V (AC power adaptor) 9.0 V (alkaline batteries)
Power consumption	5.5 W (camera recording) including the viewfinder
Installation	Vertically, Horizontally
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	–20°C to + 60°C (–4°F to + 140°F)
Dimensions	Approx. 109 x 105 x 178 mm (w/h/d) (4 3/8 x 4 1/4 x 7 1/8)
Weight	Approx. 790 g (1 lb 12 oz) excluding the battery and cassette
Microphone	Electret condenser microphone, stereo type
Supplied accessories	See page 5.

Design and specifications are subject to change without notice.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

TABLE OF CONTENTS

Section *Title* *Page*

1. GENERAL

- Introduction 5
- Identifying the Parts 5
- Connecting the Power Sources 10
- The Best Way to Use the Battery Pack 13
- Setting the Date and Time 15
- Inserting a Cassette 17
- Adjusting the Viewfinder Lens 18
- Recording a Picture Using Automatic Adjustments 19
- Selecting the Automatic/Manual Adjustment 22
- Manual Focusing 23
- Adjusting the White Balance 24
- Setting the Shutter Speed 25
- Adjusting the Exposure 26
- Zooming 27
- Close-Up (Autofocusing in Macro) 27
- Fade-in and Fade-out 28
- Using the World Clock 29
- Superimposing a Title 31
- Connection for Playback 33
- Playing Back a Tape 35
- Using the Tape Counter 36
- Editing onto Another VTR 37
- Recording from Another VTR or a TV 38
- Insert Editing 38
- Compatibility with Conventional 8mm Camcorders 39
- Hints for Better Shooting 39
- Notes and Precautions 40
- Using Your Camcorder Abroad 41
- Indications in the Viewfinder and the Display Window 42

2. DISASSEMBLY

2-1. Removal of Cassette LID Assembly 43
2-2. Removal of F Panel Assembly 43
2-3. Removal of Cabinet (L) Assembly 43
2-4. Removal of Cabinet (R) Assembly 44
2-5. Removal of Control Switch Block (CF-3) 45
2-6. Removal of DD-33P Board 45
2-7. Removal of Control Switch Block (FK-3) 46
2-8. Removal of Camera Block (VC-106 Board) 46
2-9. Removal of Lens Assembly 46
2-10. Removal of CCD Imager (CD-74 Board) 47
2-11. Removal of MD Frame Assembly 47
2-12. Removal of VS-87 Board 47
2-13. Removal of EVF Assembly 48
2-14. Removal of Cassette Compartment Holder Assembly 48
2-15. Internal Views 49

3. DIAGRAMS

3-1. Circuit Boards Location 50
3-2. Overall Block Diagram 51
3-3. Camera Block Diagram 55
3-4. Camera Control Block Diagram 59
3-5. Camera System Control Terminal Description VC-106 Board IC261 (MC68HC11L6FU) 61
3-6. Titler Block Diagram 64
3-7. Head Amp, RF Block Diagram 67
3-8. Video Block Diagram 69
3-9. Servo, System Control Block Diagram 73
3-10. Servo, System Control Terminal Description VS-87 Board IC601 (CXP80624) 76
3-11. Mode Control Terminal Description VS-87 Board IC602 (μPD75304) 79
3-12. Audio Block Diagram 81
3-13. Viewfinder Block Diagram 83
3-14. Power Block Diagram 85

4. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

- This Note is Common for Printed Wiring Boards and Schematic Diagrams 87
- Precautions for Replacement of CCD Imager Block 88
- VTR Recording Procedure for the AEP, UK Model 88

4-1. Frame Schematic Diagram 89
4-2. Printed Wiring Boards and Schematic Diagrams 93
- VC-106 Board (Camera(1)) 93
- VC-106 Board (Camera(2)) 101
- CD-74, LD-51 Boards 109
- TI-40 Board 115
- VC-106 Board (Video) 117
- FP-423, VS-87 (Head Amp, Servo, System Control) Boards 126
- VS-87 Board (RF, In/Out) 136
- AU-121, HL-4, MA-116, RM-56 Boards 146
- DD-33P Board 154
- VF-40P Board 159

4-3. Semiconductors 162

5. EXPLODED VIEWS

5-1. Cabinet (L) Assembly 163
5-2. Cabinet (R) Assembly 165
5-3. Main Board Assemblies 166
5-4. Cassette Compartment Assembly 167
5-5. Chassis (LS) Assembly 168
5-6. Mechanical Chassis Assembly (1) 169
5-7. Mechanical Chassis Assembly (2) 170
5-8. Zoom Lens Assembly 171

6. ELECTRICAL PARTS LIST 172
Hardware List 201

7. SERVICE MODE

7-1. SENSER LANC 202
7-2. How to Use RM-95 Jig (Remote Control for Adjustment) 202
7-3. Reference between Data and Bit 202
7-4. Transfer method of the Service Mode with RM-95 203
7-5. SENSER LANC Memory Map 204
7-6. Modes of Self-Diagnostic Feature 205
7-7. How to Use Practically 206
7-8. Description of Adjust and Test Modes 207

Section *Title* *Page*

8. MECHANICAL ADJUSTMENTS

8-1. Operating with the Cassette Compartment Assembly Removed 212
8-2. Tape Path Adjustment 213

9. CAMERA SECTION ADJUSTMENTS

9-1. List of Service Jigs 214
9-2. Preparation for Adjustment 216
9-2-1. Preparation 216
9-2-2. Caution 217
9-2-3. Adjustment Remote Control and Adjustment Address 218
9-2-4. Checkpoint Array (CPA) 227
9-2-5. AF Microcomputer Data Reader Jig 228
9-2-6. Data Processing 228
9-3. Camera System Adjustment 229
9-3-1. Camera DC-DC Converter Voltage Check 229
9-3-2. Camera Microcomputer Data Setting for Adjustment Pages D and F 229
9-3-3. Prime Oscillation Adjustment 233
9-3-4. PLL Adjustment 233
9-3-5. PG CONT/V SUB Adjustment 233
9-3-6. Sync Level Adjustment 234
9-3-7. Setup Adjustment 235
9-3-8. Iris Adjustment 235
9-3-9. AGC Adjustment 236
9-3-10. Matrix Adjustment 236
9-3-11. Y_H Level Adjustment 238
9-3-12. Chroma Level Adjustment 238
9-3-13. White Clip Adjustment 239
9-3-14. Y Level Adjustment 239
9-3-15. Max Gain Adjustment 240
9-3-16. H Aperture Adjustment 240
9-3-17. Burst Level Adjustment 241
9-3-18. Pre-white Balance Adjustment 241
9-3-19. Color Reproducibility Adjustment 242
9-3-20. Flange Back Adjustment and Check 242
9-3-21. Hall Adjustment 244
9-3-22. Auto White Balance Adjustment 244
9-3-23. Manual Gain Reference Setting 245
9-3-24. Manual Iris Data Adjustment 246
9-3-25. Outdoor White Balance Check 246
9-3-26. Auto Focus Check 247
9-3-27. Brightness Correction Check 247
9-3-28. Digital Titler Picture Quality Check 248
9-4. Electronic Viewfinder System Adjustment 248
9-4-1. Horizontal Tilt Adjustment 248
9-4-2. Centering Adjustment 249
9-4-3. Focus Adjustment 249
9-4-4. Aberration Adjustment 249
9-4-5. Horizontal Oscillation Frequency Adjustment 249
9-4-6. Horizontal Amplitude Adjustment 250
9-4-7. Vertical Amplitude Adjustment 250
9-4-8. Brightness, Contrast Adjustment 250
9-4-9. Horizontal Amplitude, Vertical Amplitude and Focus Checks 250
9-5. Adjusting Part Location Diagram 252

The color reproduction standard frame is contained after the adjusting part location diagram of camera section adjustments.

Section *Title* *Page*

10. VIDEO SYSTEM ADJUSTMENT

10-1. Preparation for Adjustment 255
10-1-1. Equipment Required 255
10-1-2. Precautions for Adjustment 255
10-1-3. Equipment Connection 256
10-1-4. Input Signal Check 257
10-1-5. Alignment Tape 258
10-1-6. Input/Output Level and Impedance 259
10-1-7. Record Mode (E Mode/L Mode) Changeover 259
10-2. Power Supply Adjustment and Check 260
10-2-1. Frequency Adjustment 260
10-2-2. Video 5V Adjustment 260
10-2-3. Output Voltage Check 260
10-3. System Control System Adjustment 261
10-3-1. Battery Down Adjustment 261
10-4. Servo System Adjustment 261
10-4-1. Capstan FG Frequency Check 261
10-4-2. Capstan FG Offset Adjustment 262
10-4-3. Switching Position Adjustment 262
10-5. Video System Adjustment 263
10-5-1. Playback Frequency Characteristic Adjustment 263
10-5-2. X'tal Oscillator fo Check 264
10-5-3. SYNC AGC Adjustment 264
10-5-4. IR Adjustment 264
10-5-5. Chroma Comb Filter Adjustment (1) 265
10-5-6. Emphasis Input Level Adjustment 265
10-5-7. L Mode PB Y Level Adjustment 266
10-5-8. E Mode PB Y Level Adjustment 266
10-5-9. L Mode Y FM Deviation, Y FM Carrier Frequency Adjustment 267
10-5-10. E Mode Y FM Deviation, Y FM Carrier Frequency Adjustment 268
10-5-11. YD Adjustment 269
10-5-12. Chroma Emphasis Adjustment 269
10-5-13. Chroma Comb Filter Adjustment (2) 270
10-5-14. REC C RF Level Adjustment 270
10-5-15. Recording Current Adjustment 271
10-5-16. Y Level Adjustment 275
10-5-17. HUE Phase Deviation Adjustment 275
10-5-18. Titler PLL Adjustment 276
10-5-19. Character Generator Clock Adjustment 276
10-6. Audio System Adjustment 277
10-6-1. Recording Matrix L−R Adjustment 278
10-6-2. Recording Matrix L+R Check 278
10-6-3. IR Adjustment 278
10-6-4. 1.5MHz Carrier Frequency Check 278
10-6-5. 1.7MHz Carrier Frequency Check 279
10-6-6. Deviation Adjustment 279
10-6-7. Playback Matrix L−R Adjustment 279
10-6-8. 1.5MHz Recording Level Check 280
10-6-9. 1.7MHz Recording Level Check 280
10-6-10. Overall Level Characteristic Check 280
10-6-11. Overall Frequency Characteristic Check 280
10-6-12. Overall Level Characteristic Separation Check 281
10-6-13. Overall Distortion Check 281
10-6-14. Overall Noise Level Check 281
10-7. Adjusting Part Location Diagram 282

Introduction

Overview of the CCD-TR705E

The CCD-TR705E Video Hi8 Handycam is a compact color video camera/recorder (camcorder).
You can use it to shoot the pictures you want and play them back on your television set. It is equipped with a Hi-Fi stereo recording system which offers high quality sound to match the Hi8 picture.
The camcorder uses 8 mm video-format cassettes.

Who This Manual is for

This manual is for you. You can use this manual to find exactly the information you need, whether you are familiar with video equipment or not.

How the Manual is Organized

The first section of the manual explains the preliminary steps necessary to prepare for shooting and playing back.

Other sections include shooting procedures that show you how to use the various features and functions of your camcorder. If you are a beginner, start with "Recording with automatic adjustments." If you are very familiar with camcorders, try to shoot your picture with manual adjustments as well as automatic adjustments.
If you want to start recording right away, see p.32 through 38.

The manual also includes information on how to play back a picture on a TV and how to edit your original 8 mm tape onto another video tape.

If you have any problems during operation, see the "Trouble Check" section (page 86).

How This Manual Works

Use the information below to help you follow the instructions in this manual.

- Controls and settings on the camcorder are shown in capital letters:
  ex. Set POWER to CAMERA.
- The letters in illustrations correspond to a letter in the text:
  ex. (A-1) or [a]
- Step numbers in all illustrations correspond to the step numbers in the text.
- Notes and cautions are set apart with lines.
  ex.

Note on battery life

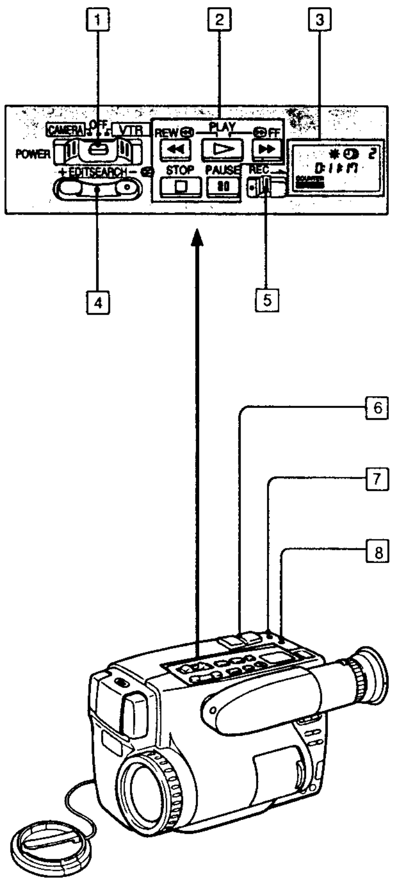
Battery will not last as long in cold places.

Supplied Accessories

The camcorder is packed together with the following units. Check to see that everything is contained in the package.
(* Attached to the camcorder.)

- Wireless Remote Commander (1)
- Remote Commander Holder (1)
- A/V connecting cable (3 phono to 3 phono) (1)
- S VIDEO connecting cable (4-pin mini DIN to 4-pin mini DIN) (1)
- Battery pack NP-55 (1)
- AC power adaptor AC-V30 (1)
- Lithium battery CR2025 (2)
- RFU adaptor RFU-90AS (1) or RFU-90E (1) or RFU-89EA (1) with an aerial selector and a screwdriver.
- Shoulder strap (1)
- Jack cover (1)*
- Lens cap (1)*
- Cassette tape (1)
- Handy Manual

(A-1)



Identifying the Parts

For details on the use of each control, refer to the pages indicated in the circle.

(A-1)

1 **POWER switch**
CAMERA: For camera recording
VTR: For playing back or editing tapes
OFF: Power off

2 **Tape transport buttons**
▷ PLAY (playback)
▶▶ FF (fast forward)
◀◀ REW (rewind)
□ (stop)
▯▯ (pause)

3 **Display window ㉟**

4 **EDIT SEARCH ⊜ button ㉟ — ㊳**

5 **● REC (recording) switch (E/AUS MODEL)**
Slide in the direction of the arrow for recording. (70), (71)

6 **POWER ZOOM button ㊽**

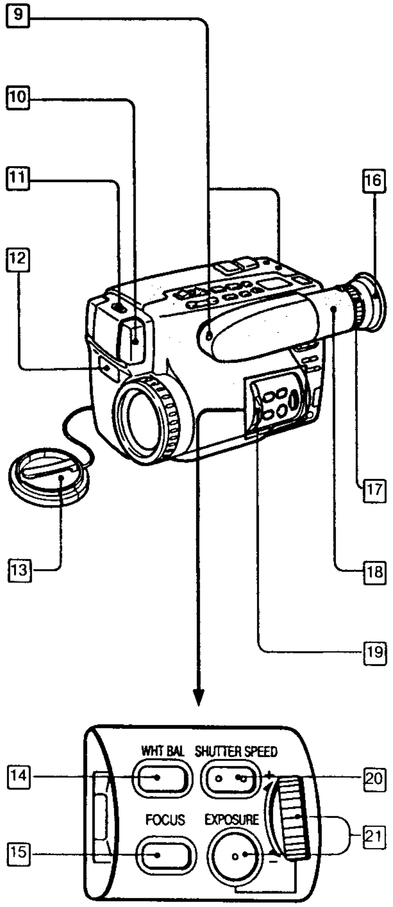
7 **RESET button**
Press to reset the counter zero.

8 **ZERO MEM (zero memory) button (67)**
Use to memorize the counter zero point.

SECTION 1
GENERAL

This section is extracted from instruction manual of E Model.

(A-2)



(A-2)

9 **Camera recording/battery lamp**
Lights during camera recording. It flashes when the battery is discharged.

10 **Built-in microphone (stereo)**

11 **BUILT-IN MIC switch ●**
Usually set to the green position. When using the camcorder in a strong wind, set to "WIND".

12 **Remote sensor ●**

13 **Lens cap**
To remove the lens cap, squeeze the sides. Hook it on the grip strap so it will not get lost.

14 **WHT BAL (white balance) button ●**

15 **FOCUS button ●**
Used for manual focusing.

16 **Eyecup**

17 **Viewfinder lens adjustment ring**
Adjust to your eyesight to assure good focus. Be sure to adjust this ring when shooting for the first time.

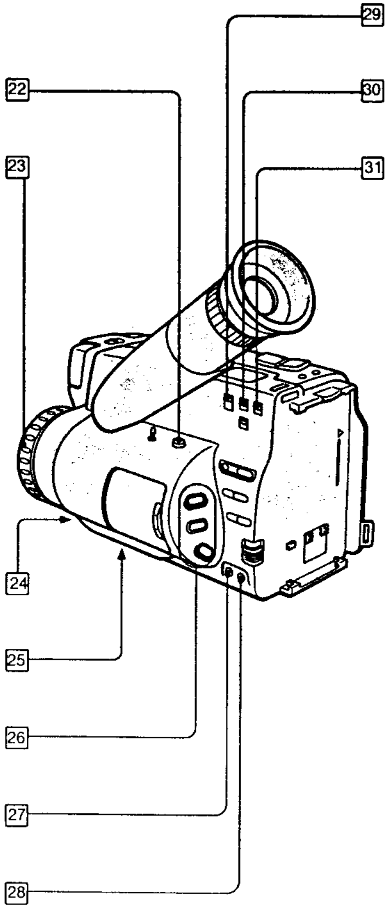
18 **Viewfinder ●**
You can monitor the monochrome picture being recorded or played back.
The caution indicators and function modes also appear here.

19 **AUTO LOCK cover ●**

20 **SHUTTER SPEED button ●**
Used to select the shutter speed.

21 **EXPOSURE button and EXPOSURE dial ●**

(A-3)



(A-3)

22 **REC START/STOP button ●**
Use when recording in a low position.

23 **Focus ring ●**

24 **FADER button ●**

25 **Lithium battery compartment ●**

26 **Superimpose buttons ● — ●**
MEMORY button
COLOR/MODE button
SUPERIMPOSE ON/OFF button

27 **REMOTE Ⓛ (LANC) * control jack (stereo mini-mini-jack)**
Connect a wired remote control unit, an editing controller, or other equipment here.

28 **PHONES (Headphones) jack (stereo mini-jack)**

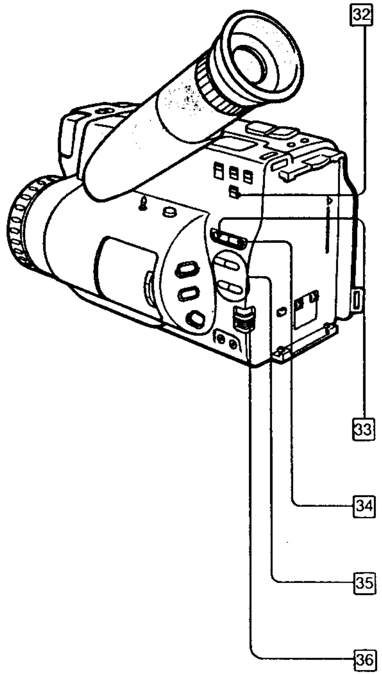
29 **Hi-Fi SOUND switch ●**
Set to the appropriate position when playing back the tape.

30 **REMOTE COMMANDER ▣ ON/OFF switch ●**
Set to ON when using the supplied Remote Commander.

31 **Hi8 AUTO/OFF switch ●**
Usually set to AUTO. When recording with the standard 8 mm video system regardless of the type of the tape which you use, set to OFF.

***About Ⓛ (LANC)**
Ⓛ (LANC) stands for Local Application Control Bus System. The Ⓛ (LANC) connector is used for controlling the tape transport of video equipment and the peripherals connected to it. This connector has the same function as the connectors indicated as CONTROL L or REMOTE.

(A-4)



(A-4)

32 **Recording mode/EDIT switch ㉜ ㉝**
Switch it depending on the operating mode.

Mode	Recording	Playback	Editing
Setting	EDIT -SP -LP RECMODE	EDIT	EDIT
Function	Recording mode switch	EDIT switch	

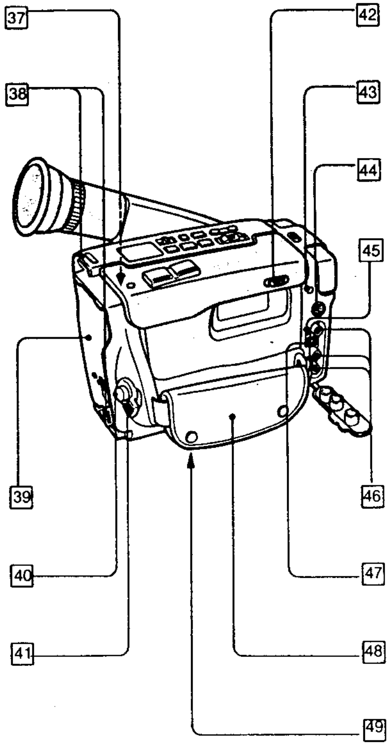
33 **SUMMER TIME button ㉝**
Press to set summer time after setting the date and time.

34 **AREA button ㉜**
Press to set the time of the place where you live or to adjust the time of the place to where you are using the camcorder.

35 **DATE (+) and TIME (NEXT) buttons ㉗**
Press to display or turn off the date or time.

36 **BATT (Battery eject) knob ⑰**
Press to remove the battery.

(A-5)



(A-5)

37 **EJECT button (below the lid) ㉓**
Press to lift up the cassette compartment and to open it automatically.

38 **Hooks for shoulder strap**
Attach the shoulder strap.

39 **Battery mounting surface**

40 **START/STOP button ㉜**
Press to start and stop camera recording.

41 **STANDBY switch ㉜**
Turn it up to set the camcorder to the standby mode.

42 **Lid lock ㉙**
Slide to the left to open the cover.

43 **MIC jack (PLUG IN POWER) (stereo minijack)**
To connect an external stereo microphone (not supplied).

44 **S VIDEO connector (4-pin mini-DIN connector) (61) – (64), (68), (70)**

45 **VIDEO/AUDIO INPUT/OUTPUT selector switch (60) (E/AUS MODEL)**

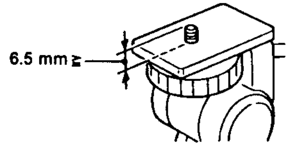
46 **VIDEO/AUDIO jacks (phono jacks) (61) – (64), (68), (70)**

47 **DC OUT (RFU adaptor DC output) jack (special minijack)**
Attach the supplied RFU adaptor here if necessary. This jack also supplies power to an external microphone.

48 **GRIP STRAP ㉝**
Adjust the length so that your thumb can easily manipulate the START/STOP button.

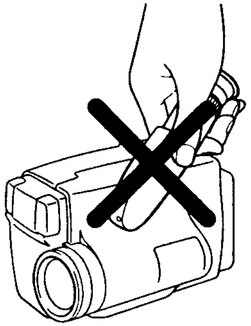
49 **Tripod receptacle ⑩**

(A-6)



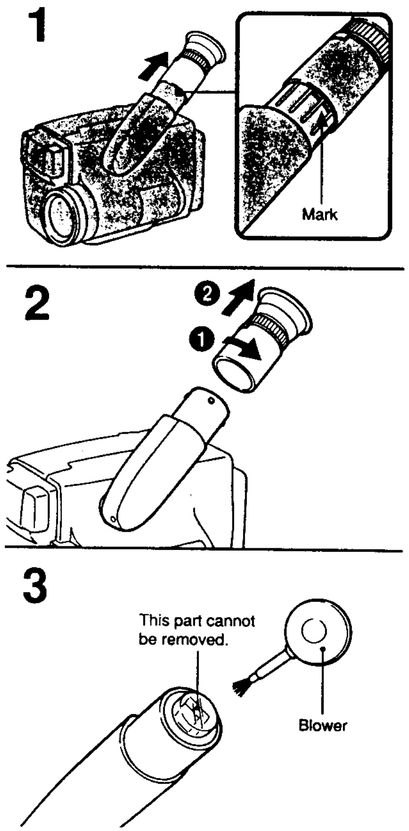
Note (A-6)
When attaching a non-SONY tripod, make sure that the length of the camera mounting screw is less than 6.5 mm (9/32 in.). Otherwise, the screw may damage the inner parts of the camcorder.

(A-7)



Caution (A-7)
Do not pick up the camcorder as shown in the illustration.

(A-8)



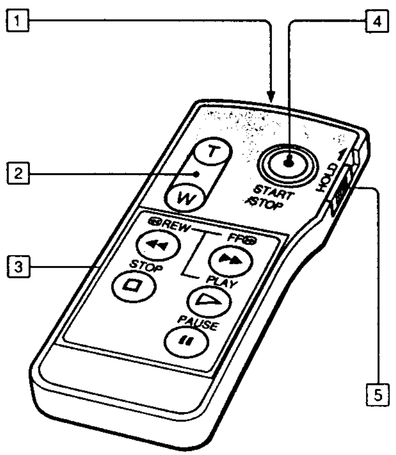
To remove dust from inside the viewfinder (A-8)

1 **Pull out the viewfinder barrel until the mark appears.**

2 **Turn it counterclockwise until it stops (❶) and pull it out (❷).**

3 **Clean the surface of the cover with a blower.**

(A-9)



Wireless Remote Commander

You can remotely record or play back a tape. The buttons on the Remote Commander with the same name or same mark as those on the camcorder have the same function.

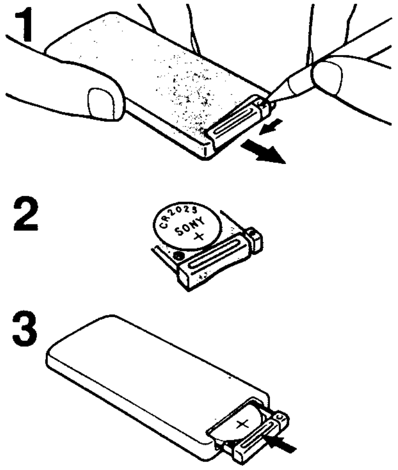
When you use the Remote Commander
Be sure to set the REMOTE COMMANDER ▣ ON/OFF switch on the camcorder to "ON", and then start operation of the camcorder, with the Remote Commander pointing towards the remote sensor. (See "Remotely controllable area" on page 13.)

(A-9)

1. **Transmitter**
2. **Power zoom button**
3. **Tape transport buttons**
   - **◂◂ REW (rewind) button**
   - **▸▸ FF (fast forward) button**
   - **□ STOP button**
   - **▷ PLAY button**
   - **▯▯ PAUSE button**
4. **START/STOP button**
5. **HOLD switch***
   Slide in the direction of the arrow to prevent the buttons from being accidentally depressed.

Note
The * indicates a function which is operable only with the Remote Commander.

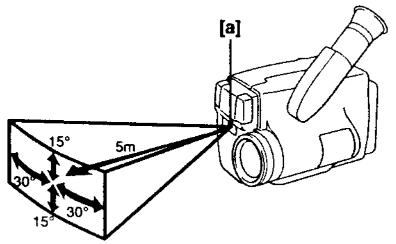
(A-10)



Installing the Lithium Battery (A-10)
Install the supplied CR2025 lithium battery into the Remote Commander with the polarities positioned correctly.

1. **Pull out the lithium battery holder from the Commander.**
2. **Install the lithium battery with the + side facing upward.**
3. **Put the lithium battery holder back into the Commander.**

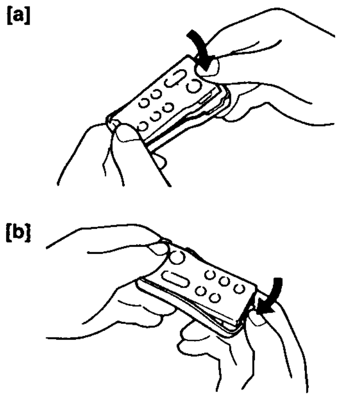
(A-11)



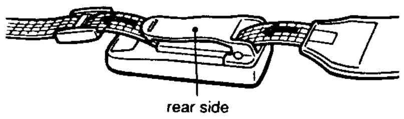
Remotely controllable area (A-11)
Point the Remote Commander towards the remote sensor **[a]**.

Notes on the Remote Commander
- Keep the remote sensor away from strong light sources such as direct sunlight or illumination.
  Otherwise the Remote control may not be effective.
- Be sure that there is no obstacle between the remote sensor and the Remote Commander.
- The command mode of the Commander is VTR2. Avoid using Sony VTRs with the same command mode at the same time.
- Be sure to set the REMOTE COMMANDER ▣ ON/OFF on the camcorder to OFF when you connect the receiver of a remote control kit (not supplied) to the REMOTE Ⓛ control jack.

(A-12)



(A-13)



Lithium battery life
The battery lasts for approximately 6 months under normal operation.
When the Remote Commander does not work, the lithium battery becomes weak or dead.
In this case, replace the battery with a Sony CR2025 or Duracell DL-2025.
Use of any other type of battery may present a risk of fire or explosion.

CAUTIONS

- Keep the lithium battery out of the reach of children. Should the battery be swallowed, immediately consult a doctor.
- Wipe the battery with a dry cloth to assure a good contact.
- Be sure to observe the correct polarity when installing the battery.
- Do not hold the battery with metallic tweezers, otherwise a short-circuit may occur.
- The Battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

Attaching the Remote Commander to the Remote Commander holder
(A-12)

[a] When attaching the Remote Commander to the Remote Commander holder.
[b] When detaching the Remote Commander from the Remote Commander holder.

You can clip the Remote Commander holder on your coat pocket or belt, or slide it onto a shoulder belt before attaching the Remote Commander to it.
(A-13)

Preparing your camcorder 1

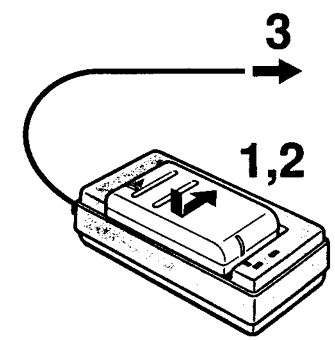
Connecting the Power Sources

First, Choose the Power Source.

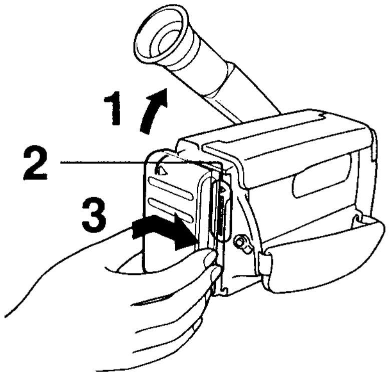
Place	Power source	Accessory to be used
Outdoors	Battery pack	Battery pack NP-55 (supplied), NP-77, NP-77H, NP-77HD
	Alkaline batteries	Battery case EBP-77
Indoors	House current	AC power adaptor AC-V30 (supplied), AC-V55, AC-S10
In the car	12V or 24V car battery	DC pack DCP-77, AC power adaptor AC-V55 and the car battery cord DCC-16AE

Note on power source
Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted tape. In this case supply power again immediately.

(B-1)



(B-2)



Using the Battery Pack

Step 1

Charge the battery pack. **(B-1)**

1 **Align the right side of the battery pack with the line on the AC power adaptor.**

2 **Slide in the battery pack to the right.**

3 **Connect the AC power adaptor to a wall outlet.**

	NP-55	NP-77H/77HD	NP-77
Required charging time	60	140	120

(approx. minutes using AC-V30)

See the instruction manual of the AC power adaptor for details.

Step 2

Mount the battery pack on the camcorder. **(B-2)**

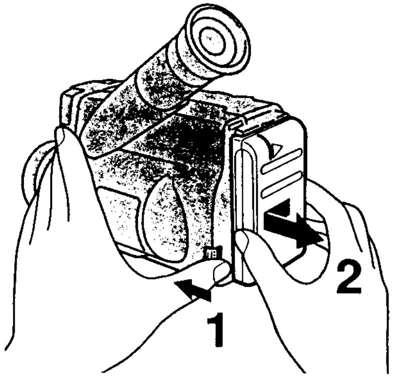
1 **Lift up the viewfinder.**

2 **Align the right side of the battery pack with the white line on the camcorder.**

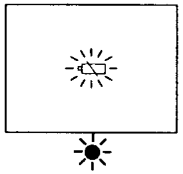
3 **Slide the battery pack to the right.**

Note: Make sure the battery fits completely on the mounting surface of the camcorder. An imperfect fit may damage the projections on the camcorder.

(B-3)



(B-4)



To remove the battery pack (B-3)
While pressing the BATT knob in the direction of the arrow, slide the battery pack to the left and pull it out as illustrated.

Battery life
A fully charged battery pack lasts for:

	NP-55	NP-77H/77HD	NP-77
Battery life	60	150	120

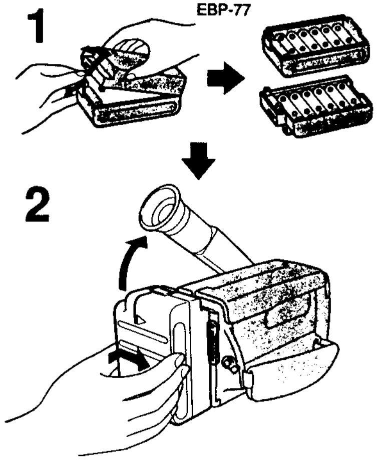
(approx. minutes, continuous recording indoors)

When the battery becomes weak, the 🔋 indication and red lamp flash slowly in the viewfinder.
(B-4)
Replace the battery pack with a fully charged one.
The 🔋 indication also appears in the display window.

Other options for charging
- AC-V55 AC power adaptor:
  You can charge two battery packs simultaneously.
- AC-S10 AC power adaptor:
  This adaptor has a discharging function. When you want charging only, slide the skip switch on the adaptor in the direction of the arrow.
- BC-55 or BC-77 portable battery charger:
  You can charge a battery pack on 100 — 240 V AC.
- DC-V30 car battery charger:
  You can charge a battery pack by connecting the car battery charger to the cigarette lighter socket. This battery charger also supplies power for Sony 8 mm equipment that operates on a battery pack.

If you have an NP-4000 battery pack
You can use it for a long outdoor recording.

(B-5)



Using Alkaline Batteries

(B-5)

The EBP-77 battery case is required (not supplied) to use 12 alkaline batteries.

1. **Insert the R6 (AA) size alkaline batteries into the battery case.**
2. **Attach the case in the same way as the battery pack.**

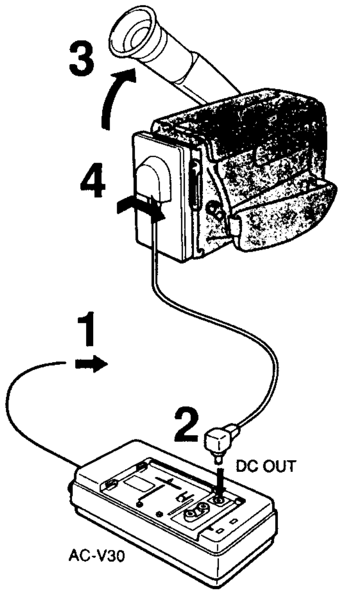
Battery life (when using Sony alkaline batteries)
The battery lasts for approximately 2 hours and 15 minutes under continuous recording indoors. However, when you use non-Sony alkaline batteries, their life may be shorter.

Notes on battery life

- Batteries will not last as long in cold places.
- No indication appears in the viewfinder when the batteries are weak.

To remove the battery case
Remove it the same way you do the battery pack. See page 17.

(B-6)



Using House Current

(B-6)

Use the supplied AC-V30 AC power adaptor.

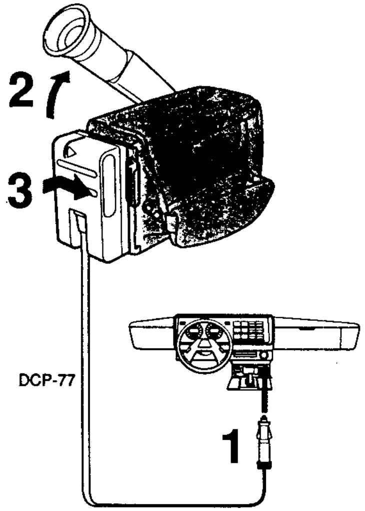
1. **Connect the AC power adaptor to a wall outlet.**
2. **Insert the connecting cord supplied with the AC-V30 AC power adaptor into the DC OUT jack on the AC power adaptor.**
3. **Lift up the viewfinder.**
4. **Align the right side of the connecting plate with the white line on the camcorder, and slide it in to the right.**

See the instruction manual of the AC power adaptor for details.

To remove the connecting plate
Remove it the same way you do the battery pack. See page 17.

Other option
You can also use the AC-V55 and AC-S10 AC power adaptor.

(B-7)



Using the Car Battery

(B-7)

The DCP-77 DC pack is required (not supplied) to use the car battery.

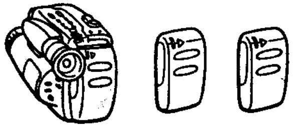
1. **Connect the cord to the cigarette lighter socket of a car (12 V or 24 V).**
2. **Lift up the viewfinder.**
3. **Align the right side of the DC pack with the white line on the camcorder, and slide it in to the right.**

To remove the DC pack
Remove it in the same way as you do with the battery pack. See page 17.

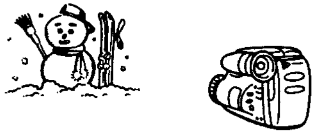
Other options

- You can also use the AC-V55 power adaptor and the DCC-16AE car battery cord to operate this camcorder on a 12 V or 24 V car battery.

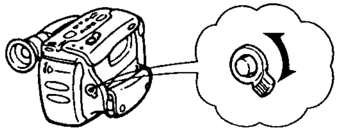
(C-1)



(C-2)



(C-3)



The Best Way to Use the Battery Pack

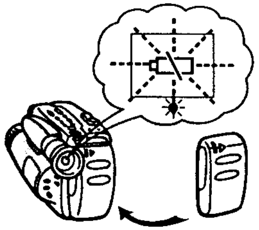
How to Prepare the Rechargeable Battery Pack

Have sufficient battery pack power to do 2 or 3 times as much recording as you have planned. (C-1)
"Battery life" as indicated in the instruction manual or catalogue of the camcorder is measured by the continuous recording time of the camcorder, placed at a room temperature using a fully-charged battery.

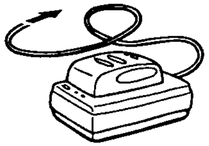
Battery life is shorter in a cold climate. (C-2)
Battery efficiency is decreased and the battery will wear out more quickly.

Turn the STANDBY switch of the camcorder off when not recording to save battery power.
A smooth recording can be made even if recording is stopped and started again. (C-3)
While positioning the subject or selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.

(C-4)



(C-5)



When the Rechargeable Battery Pack should be Replaced

(C-4)

When the ▭ mark in the viewfinder changes from slow flashing to rapid flashing and the battery lamp lights in the viewfinder while you are recording
Turn off the power switch of the camcorder and replace the battery pack. Leave the tape in the camcorder in order to obtain a smooth recording after the battery pack is replaced.

Notes on Charging

Before using the battery pack, charge it sufficiently. A brand-new battery pack is not charged.

Recharge the battery pack only when it is discharged. (C-5)

- If recording is completed before the ▭ mark appears in the viewfinder, we recommend that you remove the tape, set POWER to CAMERA, turn up STANDBY, and leave the camcorder until the ▭ mark flashes rapidly.
- Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you fully charge and discharge the battery again.
- When you use the AC-S10 AC power adaptor, we recommend you to fully discharge the battery first, and then charge it completely.

Recharge the battery pack before using.
If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged. Charge it again but in this case, the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

Keep the Terminals Clean

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened.
When the terminals are not clean or when the battery pack has not been used for a long time, install and remove the battery pack from time to time. This will improve the contact. Also, wipe the + and – terminals with a soft cloth or paper.

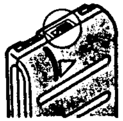
Notes on the Rechargeable Battery Pack

Why the battery pack heats up
During charging or recording, the battery pack heats up. This means energy has been generated and a chemical change has occurred inside the battery pack. This is not dangerous.

How to care for the battery pack

- Remove the battery pack from the camcorder after using it, and keep it in a cool place.
  When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder even if the POWER switch is turned off.
  It causes over-discharging and shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Thus it is recommended you charge the battery before using it.

(C-6)



How to use the switch on the battery pack (C-6)
This switch is provided so that you can remember the charging condition. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is dead.

How many times can the battery pack be recharged
It can be fully charged and discharged about 500 times under normal temperatures. When the ▭ mark flashes rapidly in the viewfinder, even though it is fully charged the battery pack is dead and needs to be replaced with a new fully-charged battery pack.

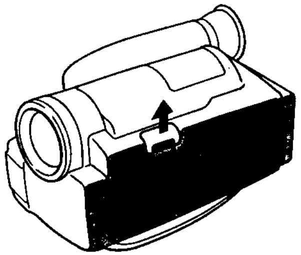
Temperatures during charging
Lower temperatures require a longer charging time. Charging under temperatures ranging from 10°C to 30°C (from 5°F to 85°F) is recommended.

Preparing your camcorder 2

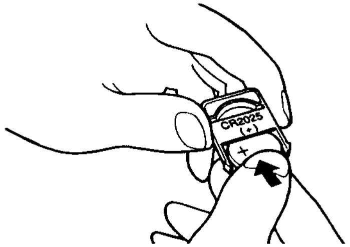
Setting the Date and Time

(D-1)

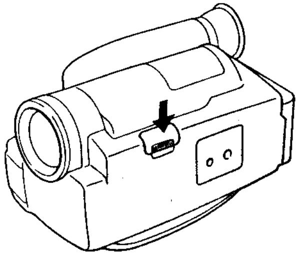
1



2



3



Inserting the Lithium Battery

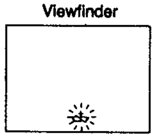
(D-1)

This camcorder uses a lithium battery to activate the clock and to keep a title in memory. Before operating it for the first time, install the supplied lithium battery.

1. **Pull out the lithium battery holder from the bottom of the camcorder.**
2. **Install the supplied CR2025 lithium battery with the + side facing the (+) on the battery holder.**
3. **Put the lithium battery holder back into the camcorder.**

To remove the lithium battery
Remove the lithium battery holder from the camcorder, pull out the lithium battery and insert a new one.

(D-2)



Lithium battery life

The battery lasts for approximately 1 year under normal operation.

When the lithium battery becomes weak, the 🔋 indication will flash on the viewfinder screen for about 5 seconds (when POWER is set to CAMERA). **(D-2)**

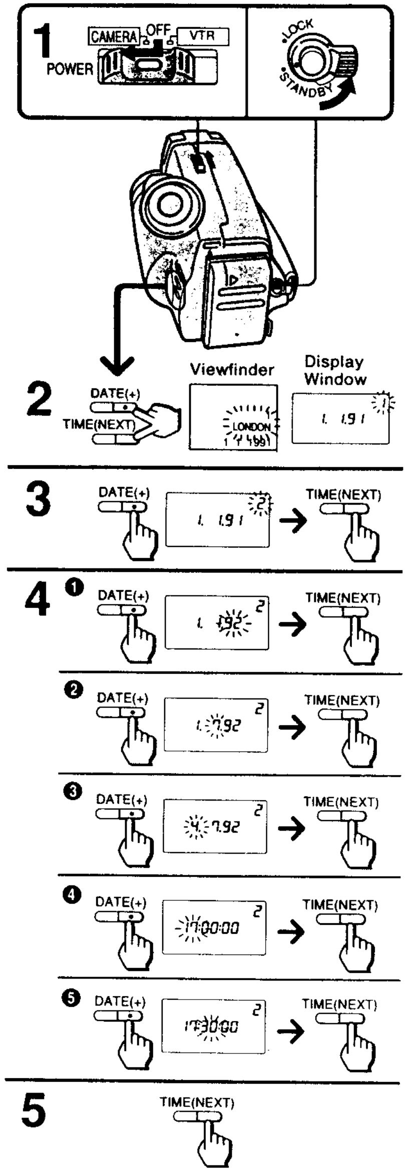
In this case, replace the battery with a Sony CR2025 lithium battery. Use of any other type of battery may present the risk of fire or explosion.

While replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, you must readjust the date, time, and title.

CAUTIONS

- Keep the lithium battery out of the reach of children.
  Should the battery be swallowed, immediately consult a doctor.
- Wipe the battery with a dry cloth to assure a good contact.
- Be sure to observe the correct polarity when installing the battery.
- Do not hold the battery with the metallic tweezers, otherwise a short-circuit may occur.
- The Battery may explode if mistreated.
  Do not recharge, disassemble, or dispose of in fire.

(D-3)



Setting the Date and Time

(D-3)

Make sure that a power source and lithium battery are attached.

1 **Set POWER to CAMERA, and turn STANDBY up.**

2 **Press DATE and TIME simultaneously for more than 2 seconds until "1 LONDON" flashes inside the viewfinder.**
DATE now functions as +
(to advance numbers) and TIME functions as NEXT (to execute).

3 **While refering to the illustration and the table on page 54 and 55, press + until your area name and number appear and then press NEXT.**

4 **Set the year, month, day, hour and minute, in this order.**
First adjust the flashing digits with + and then press NEXT.

5 **Press NEXT to set the second.**
The clock starts operating.

To correct the date and time setting
Press NEXT repeatedly until the minute digits stop flashing. Then repeat step 2 to 5.

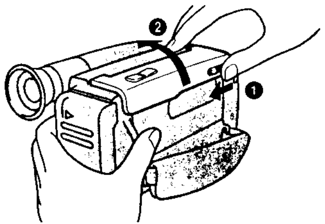
To advance the digits faster
Keep + pressed.

To check the preset date and time
Press DATE or TIME. When you press the same button again, the indication goes off.

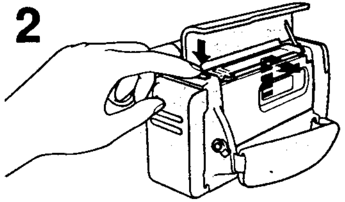
To set summer time
Press SUMMER TIME. The time changes to summer time, and ☀ indication appears inside the viewfinder and in the display window.
To set to standard time, press SUMMER TIME again.

(E-1)

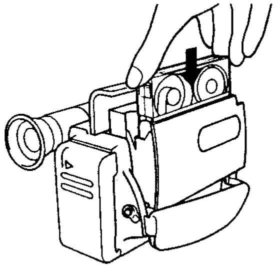
1



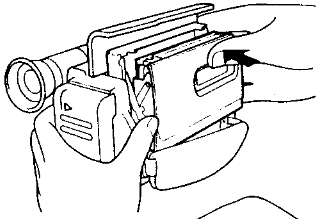
2



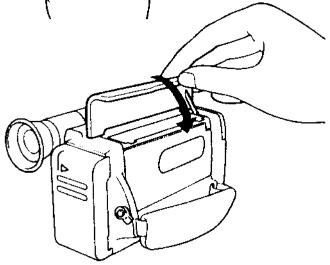
3



4



5



Preparing your camcorder 3

Inserting a Cassette

Inserting a Cassette

(E-1)

Make sure that a power source is connected.

1 **While sliding the lid lock in the direction of the arrow (❶), lift up the lid until it clicks (❷).**

2 **Press EJECT.**
The lid of the cassette compartment will automatically lift up and open.

3 **Insert a cassette with the window facing out.**

4 **Press the PUSH mark on the cassette compartment cover to close it.**

5 **Close the lid.**

Ejecting the Cassette

Make sure that a power source is connected.

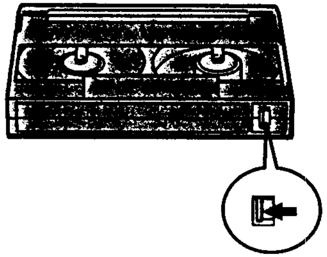
1 **While sliding the lid lock in the direction of the arrow, lift the lid up until it clicks.**

2 **Press EJECT.**
The lid of the cassette compartment will automatically lift up and open.

3 **Take out the cassette and press the PUSH mark on the compartment to close it.**

4 **Close the lid.**

(E-2)



Preventing Accidental Erasure

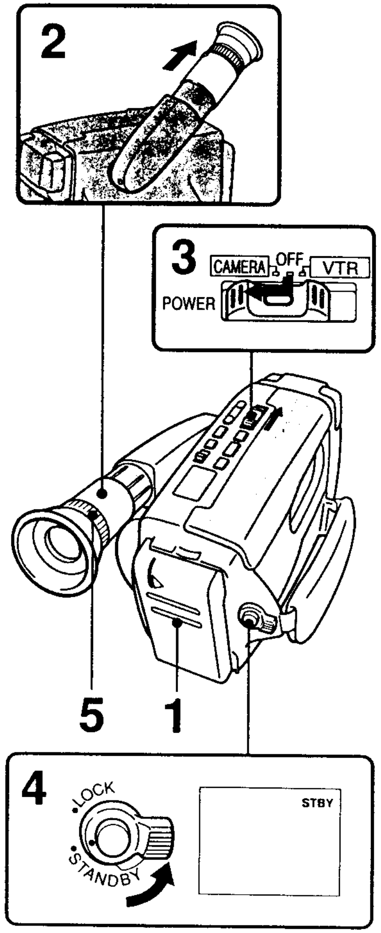
(E-2)

Slide the tab on the cassette to expose the red mark. This will prevent accidental recording.
To re-record on this tape, slide the tab back out covering the red mark.
If you try to record with the red mark exposed, the ▣ and ⏏ indications flash in the viewfinder.

Notes on handling cassettes

- Never insert anything in the small holes on the rear of the cassette. These holes are used to sense the type of tape, thickness of tape, or if the tab is out or in, etc.
- Store cassettes in their cases and keep them in an upright position to prevent intrusion of dust and uneven winding.
- Store cassettes in their cases and keep them away from heat, humidity, direct sunlight, magnetic fields, dust and mold.

(F)



Adjusting the Viewfinder Lens

The position of the viewfinder lens for optimum vision varies depending on the person. Adjust it when you use the camcorder for the first time, or when you use it after someone else did.

(F)

1 **Make sure a power source is connected.**

2 **Pull the viewfinder out until it clicks.**

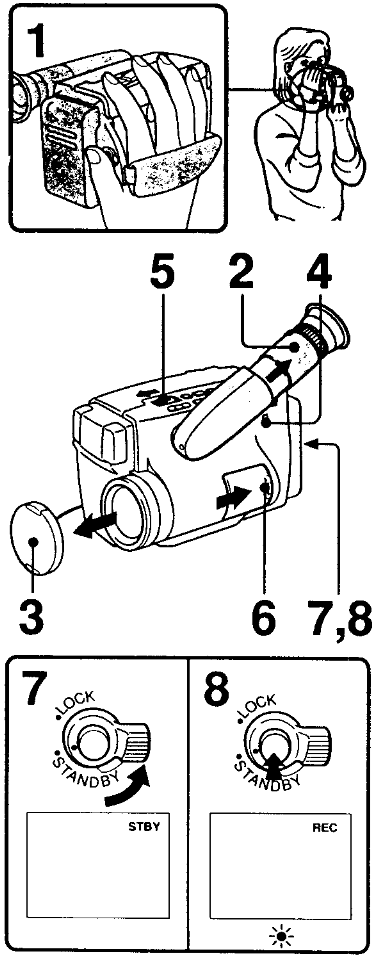
3 **While pressing the green button, set POWER to CAMERA.**

4 **Turn STANDBY up.**

5 **Turn the viewfinder lens adjustment ring so that "STBY" displayed in the viewfinder screen comes into sharp focus.**

Recording a Picture Using Automatic Adjustments

(G-1)



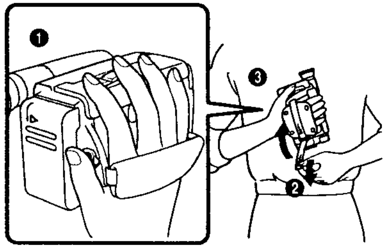
Before recording "once-only" events, we strongly recommend you make a trial recording and check that everything is working properly.

(G-1)

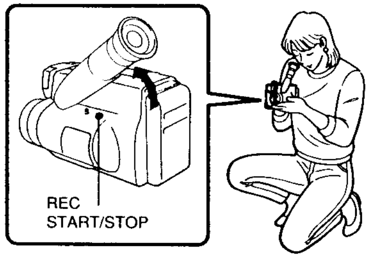
Start Recording

1. **Hold the camcorder as illustrated.**
   Put your hand through the grip strap and check that your thumb can easily touch START/STOP
2. **Make sure that the viewfinder is pulled out.**
3. **Remove the lens cap and clip it on the grip strap.**
4. **Set the Recording mode/EDIT switch to LP (long play) or SP (standard play), according to the length of your planned recorded.**
5. **While pressing the green button, set the POWER to CAMERA.**
6. **Make sure that the AUTO LOCK cover is closed.**
7. **Turn STANDBY up.**
   "STBY" appears in the viewfinder. The camcorder is now in the standby mode, and focus is adjusted automatically.
8. **Press START/STOP.**
   "REC" appears and the red lamp lights up in the viewfinder. The camcorder is now recording.

(G-2)



(G-3)



To standby (to stop momentarily)
Press START/STOP again.
"STBY" appears in the viewfinder. The camcorder is in standby mode again.

To stop
Turn STANDBY down and set POWER to OFF.

To set the Hi8 AUTO/OFF switch
See pages 7 and 73.

Using the supplied Remote Commander
You can record yourself with your friends or family.

How to fit the grip strap (G-2)
Looking at step 1 on the previous page, hold the camcorder against your body and pull the grip strap upward.

For low-position recording (G-3)
The viewfinder can be turned 90 degrees upward.
It can be used in either the pushed-down or pulled-out position.

1. Turn STANDBY up.
2. Press REC START/STOP with your left thumb.

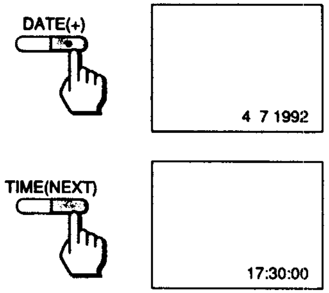
Note on recording
To record from the beginning of the tape, run the tape for about 15 seconds before recording. This will avoid missing the starting point when the tape is played back.

Note on the standby mode
If you leave the camcorder in the standby mode for 5 minutes or more, the camcorder will turn off automatically. To resume the standby mode, turn STANDBY down once and slide it up again. To start recording, press START/STOP directly.

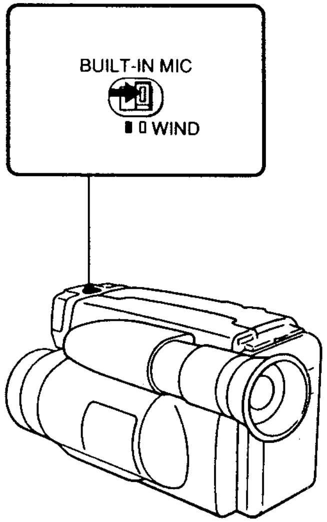
Recording mode
You can record and play back a picture on a tape in both SP (standard play) and LP (long play) modes.
However, the quality of the playback picture in the LP will not be as good as that in the SP mode.

Note on PCM recording and playback
PCM recording or playback is not possible with this camcorder. The PCM sound recorded or after-recorded with another video recorder cannot be played back with this camcorder.

(G-4)



(G-5)



To Record Date and Time

(G-4)

During camera recording or when in recording pause mode, press DATE for date indication or TIME for time indication.
The date or time displayed in the viewfinder is recorded with the picture.

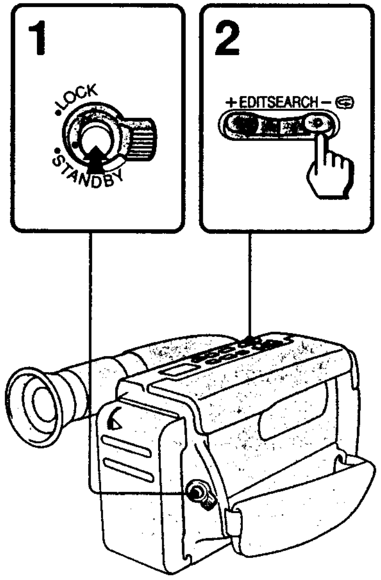
To stop recording date and time
Press DATE or TIME again. The picture recording continues.

When There is a Strong Wind

(G-5)

Set BUILT-IN MIC to "WIND."
The noise from the wind will be reduced. The ⊏⊐ (wind) indication appears inside the viewfinder.
After recording, set it to the green position (green mark).
If you forget to do this, sound may be recorded unnaturally because of this function.

(G-6)



To Check the Last Portion of the Previous Recording

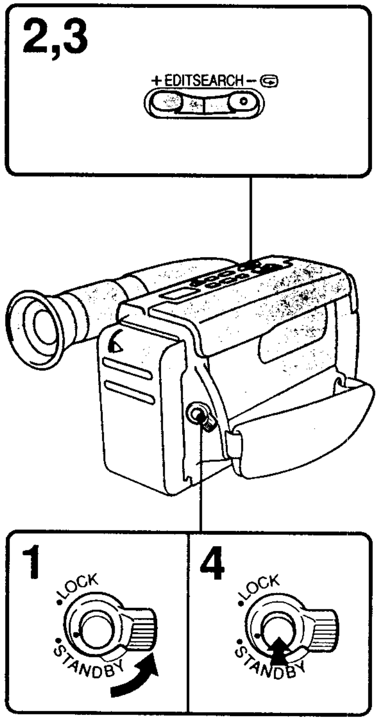
(G-6)

1 **Set the camcorder in the recording pause mode by pressing START/STOP.**

2 **Press – side of EDITSEARCH (⊜) momentarily.**
The last few seconds of the recorded portion are rewound and then the recorded picture appears inside the viewfinder. After a few seconds of playback, the camcorder goes back to recording pause mode.

If the picture has not recorded
The video heads may be contaminated. Clean the heads using the Sony V8-25CLH video head cleaning cassette or equivalent.

(G-7)


2,3
+ EDITSEARCH –
1
LOCK
STANDBY
4
LOCK
STANDBY

To Re-record over a Previously Recorded Portion during Recording

(G-7)

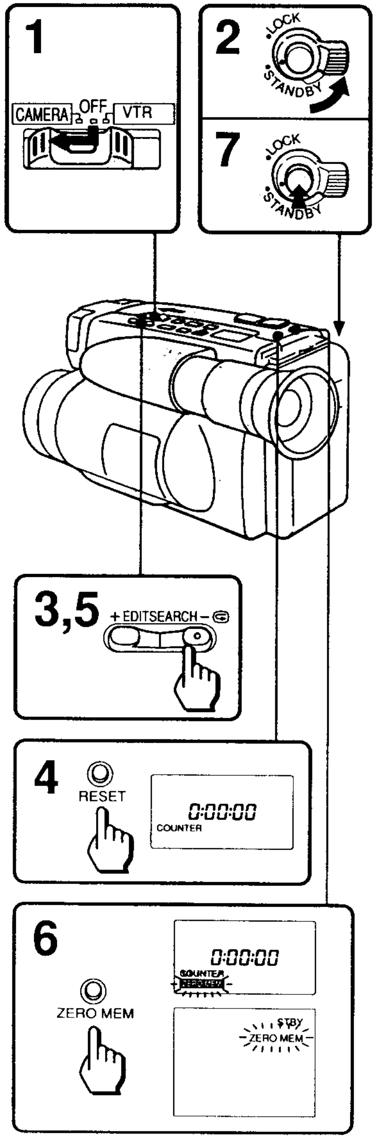
1. **Turn STANDBY up to set the camcorder to the standby mode.**
2. **Look in the viewfinder and find the point from where you want to begin the recording:**
   Keep pressing the + side of EDITSEARCH to advance the picture at a normal playback speed, or the – side to reverse the picture at a normal playback speed.
3. **At the desired point, release EDITSEARCH.**
4. **Press START/STOP to start recording.**

To pause
Press START/STOP again.

To stop
Turn STANDBY down.

Note
A smooth transition between scenes can be made even if STANDBY is turned down and up, or even if the power is turned off and on again, provided that the tape is not removed.

(G-8)


1
CAMERA
OFF
VTR
2
LOCK
STANDBY
7
LOCK
STANDBY
3,5
+ EDITSEARCH –
4
RESET
0:00:00
COUNTER
6
ZERO MEM
0:00:00
COUNTER
ZERO MEM
STBY
ZERO MEM

To Re-record a Picture in the Middle of a Recorded Tape (Insert Recording)

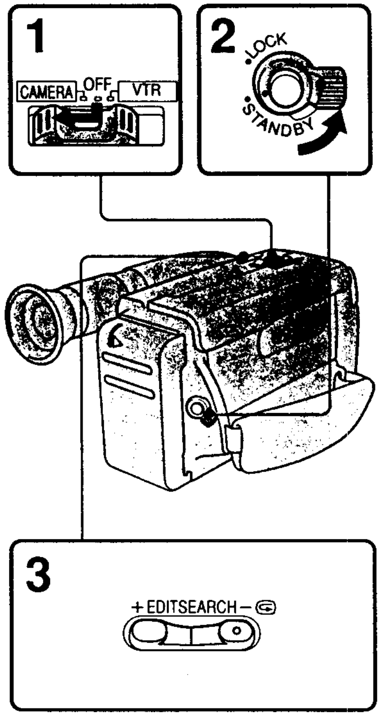
(G-8)

1. **While pressing the green button, set POWER to CAMERA.**
2. **Turn STANDBY up to set the camcorder to the standby mode.**
3. **While looking in the viewfinder, keep pressing the + or – side of EDITSEARCH and release the button where you want to end the insertion.**
   The camcorder is set to standby mode.
4. **Press RESET.**
   The counter is reset to zero.
5. **While looking in the viewfinder, keep pressing the – side of EDITSEARCH and release the button at the point where you want to start the insertion.**
6. **Press ZERO MEM.**
   The insert ending point is stored in memory.
7. **Press START/STOP.**
   Insert recording begins.
   It stops automatically near the counter zero point.

To cancel ZERO MEM
Press ZERO MEM.

Note
The picture may be distorted at the end of the inserted portion when played back.

(G-9)



Playing Back Your Picture Instantly

(G-9)

You can check the recorded picture in the viewfinder.

1 **While pressing the green button, set POWER to CAMERA.**

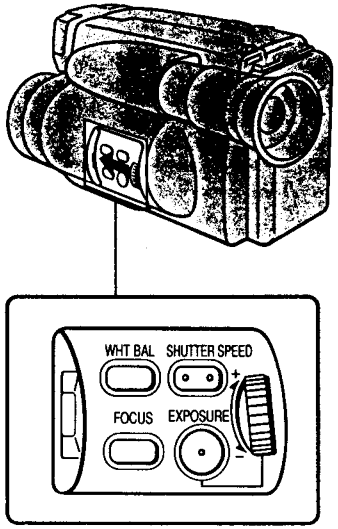
2 **Turn STANDBY up.**

3 **Keep pressing the + or – side of EDITSEARCH to play back the picture.**
+ side: to view the playback picture
– side: to view the playback picture in reverse

To stop playback, release EDITSEARCH.

To monitor the sound while viewing the playback picture in the viewfinder
Connect a headphone to the PHONES jack.
1 While pressing the green button, set POWER to VTR.
2 Press ◄◄ to rewind the tape and press ☐ where you want to stop.
3 Press ▷ to start playback.

(H)



Selecting the Automatic/Manual Adjustment

When you close the AUTO LOCK cover, the focus, white balance, and exposure adjust automatically, and the shutter speed is set at 1/50. The automatic function offers you worry-free operation under most shooting conditions. But under certain circumstances, manual adjustment is better for effective recording. For manual adjustment, open the AUTO LOCK cover and select an appropriate setting.

Even if you open the AUTO LOCK cover:
The setting of each button is the same as the automatic adjustment until you change it.

What Each Button Does

(H)

To adjust each item manually, see the page as shown in the table.

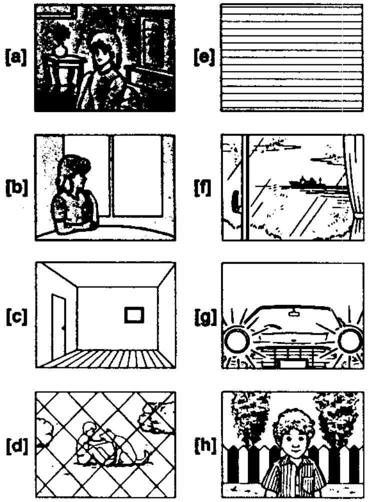
Item	See page
Focus	40
White balance	42
Shutter speed	44
Exposure	46

When you install the battery for the first time
The white balance, focus and exposure automatically adjust and the shutter speed is set at normal speed (1/50) regardless of the position of the AUTO LOCK cover.

About the previous settings
As long as you do not remove the battery, even if you set POWER to OFF, the previous settings are stored.

Manual Focusing

(I-1)



When you close the AUTO LOCK cover and center the subject through the viewfinder, you can easily get an auto-focused picture under most shooting conditions. But we recommend manual focusing in the following cases.

[a] to **[h]** correspond to the illustrations **(I-1)**.

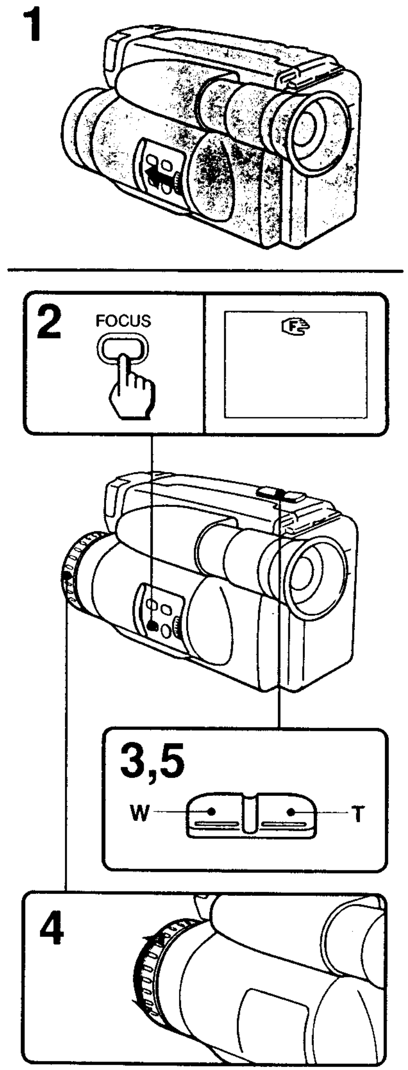
- **[a]** Insufficient light
- **[b]** Too much brightness behind the subject
- **[c]** Subject with little contrast—wall, sky, etc.
- **[d]** Subjects beyond nets, etc., or another subject passes in front of the camcorder
- **[e]** Horizontal stripes
- **[f]** Subject through frosted glass
- **[g]** Bright subject or subject reflecting light
- **[h]** High contrast behind the subject (the background may be focused)
- **[i]** Under the following circumstances
  - When shooting a stationary subject using a tripod
  - To save battery power

Auto-focusing does not function momentarily when:

- The setting of the shutter speed is changed.
- Exposure is adjusted manually.
- Lighting conditions change quickly.
- Zooming is changed from wide-range to telephoto.

This camcorder keeps in focus by referring to the picture contrast, which is weak in the above situations.

(I-2)



Focusing Manually

(I-2)

1. **Slide open the AUTO LOCK cover.**
2. **Press FOCUS.**
   The F(manual focusing) indication appears in the viewfinder.
3. **Keep pressing the T side of the power zoom button until the zooming stops (telephoto).**
4. **Turn the focus ring to achieve sharp focus.**
5. **Set the desired shot length using the power zoom button.**

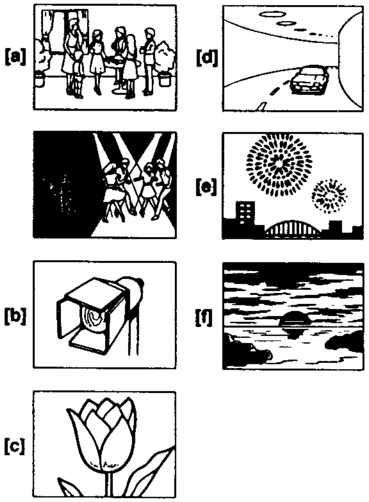
Some helpful hints

- When shooting in relatively dark places such as indoors, the depth of field in proper focus is very shallow. For best results, shoot at wide angles after focusing in telephoto.
- When shooting a scene with lots of movement in bright light, keep pressing the W side of the power zoom button until the zooming stops (wide angle).

Note

The focus ring does not have a stop position.

(J-1)



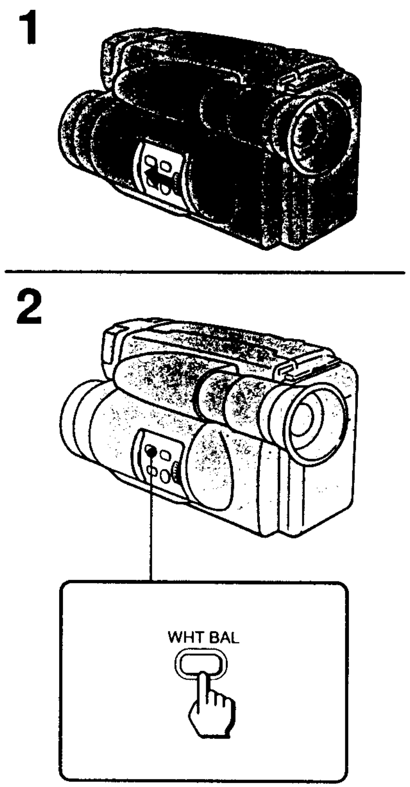
Adjusting the White Balance

When you close the AUTO LOCK cover, the auto white balance function of this camcorder adjusts the picture to natural colors under most shooting conditions. However, in the conditions listed below, adjust the white balance manually.

[a] to **[f]** correspond to the illustrations **(J-1)**.

	Conditions	Indication in the viewfinder
[a]	Lighting conditions change quickly	💡
[b]	Too bright, such as in photograph studios	
[c]	Monochromatic subject or background	HOLD
[d]	Under sodium lamp	💡
	Under mercury lamp	
	Under a color matching fluorescent lamp	☀
[e]	Recording outdoors: a night view, neon signs or fireworks	
[f]	Recording outdoors: scenes after sunset or before sunrise	

(J-2)



Adjusting the White Balance Manually

(J-2)

1 Slide open the AUTO LOCK cover.

2 Select the desired white balance mode by pressing WHT BAL.
Each time you press the button, the indication changes as follows:

No indication → HOLD → ☀ → 💡
(auto) (outdoors) (indoors)
↑_______________________________|

Note on manual adjustment
When moving from indoors to outdoors or vice versa, close the AUTO LOCK cover and open it again.

What is the HOLD mode?
In HOLD mode, the camcorder adjusts to the color temperature of the subject's light source automatically and keeps that temperature during recording. When recording some subjects with different color temperature, you can achieve a recording with natural colors without being affected by the surroundings.

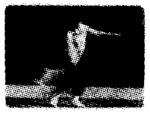
To set into the HOLD mode

1 Close the AUTO LOCK cover.
The camcorder enters automatic white balance mode.

2 Point at and record a white, flat object such as a white wall or paper.

3 Open the AUTO LOCK cover and press WHT BAL to display the HOLD mark in the viewfinder.
When you change the battery pack or the light source is changed, follow the above procedures again.

(K-1)



Setting the Shutter Speed

(K-1)
When you record a fast-moving subject, increase the shutter speed so that you can see a clear picture in playback pause mode. The depth of field in proper focus becomes shallow at a higher shutter speed. This is effective to record the main subject in sharp focus and the surroundings out of focus.

Note
When recording at a high-speed shutter setting, record in a brighter place than usual.

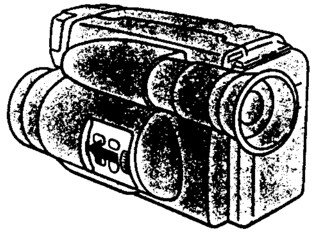
Recommended setting for your situation
Choose an appropriate shutter speed according to the situation, referring to the following chart.

Example use	Recommended shutter speed
• On clear days, recording a golf or tennis swing (To view the hit ball clearly in the still picture mode, set to 1/4000 or 1/10000) • Recording skiers	1/10000 or 1/4000 or 1/2000
• On overcast days, recording a moving merry-go-round or roller-coaster • Recording outdoors from inside a vehicle (for stable shooting)	1/1000 or 1/250
• Instead of the ND2 filter (To reduce the exposure level to about a half) • Recording indoor sports (for stable shooting)	1/120

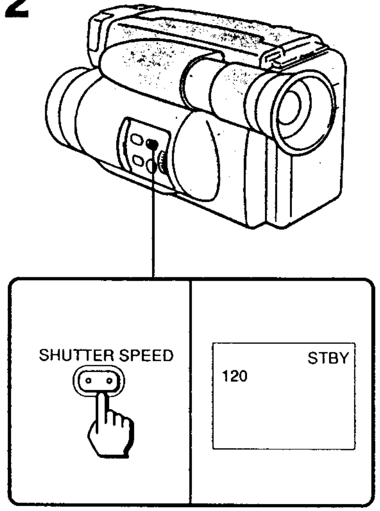
When playing back a picture recorded at certain speeds
Use 8 mm video equipment with a clean still function to obtain a noiseless still picture.

(K-2)

1



2



Selecting the Shutter Speed

(K-2)

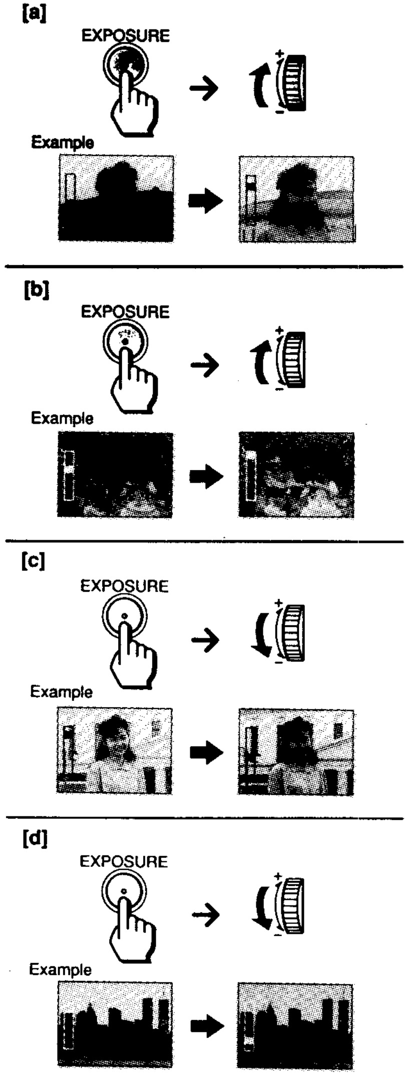
1. **Slide open the AUTO LOCK cover.**
2. **Press SHUTTER SPEED repeatedly until the desired shutter speed indication appears.**
   Each time you press the button, the indication changes as follows:

→No indication (1/50) → 120 (1/120) → 250 (1/250)
10000 (1/10000)
4000 (1/4000) ← 2000 (1/2000) ← 1000 (1/1000) ←

Notes

- When you shoot a very bright subject at a faster shutter speed, a vertical light, belt-like line (smear) may appear on the screen.
- When you record at certain shutter speeds under a light discharge tube, such as a fluorescent lamp, sodium lamp, or mercury lamp, the brightness of the recorded picture may vary (causing the picture to flicker).

(L-1)


[a]
EXPOSURE
Example
[b]
EXPOSURE
Example
[c]
EXPOSURE
Example
[d]
EXPOSURE
Example

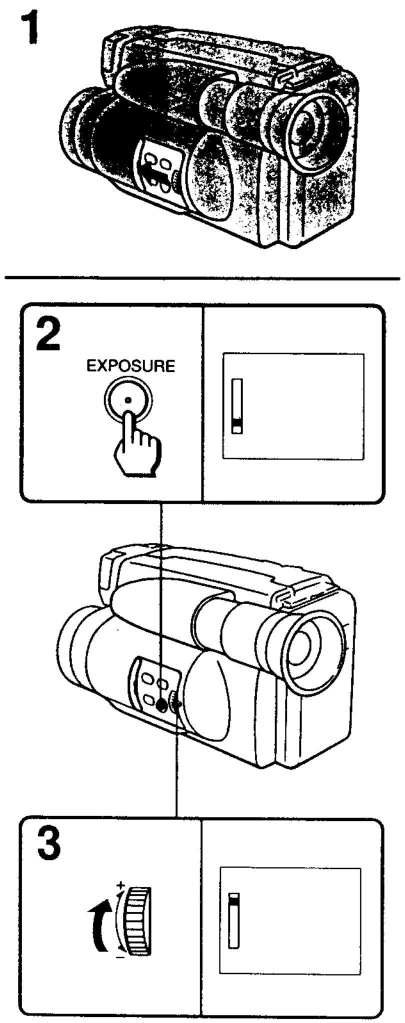
Adjusting the Exposure

When you close the AUTO LOCK cover, the exposure is automatically controlled in this camcorder. However, in the conditions listed below, adjust the exposure manually.

[a] to **[d]** correspond to the photographs **(L-1)**.

[a] The background is too bright (backlighting).
[b] Insufficient light: most of the picture is dark.
[c] Bright subject and dark background
[d] To record the darkness faithfully

(L-2)


1
2
EXPOSURE
3

Adjusting the Exposure Manually

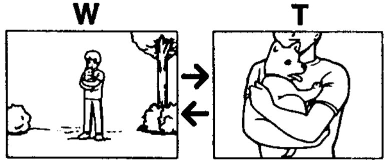
(L-2)

1. **Slide open the AUTO LOCK cover.**
2. **Press EXPOSURE.**
   The exposure indication appears.
3. **Adjust the exposure by using the EXPOSURE dial.**

To restore the automatic exposure mode
Press EXPOSURE until the exposure indication in the viewfinder disappears.

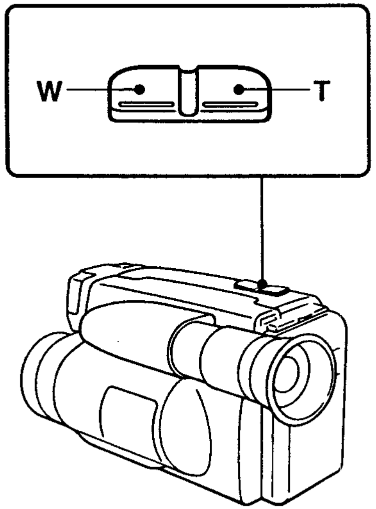
Zooming

(M-1)



The size of the subject in the screen can be changed. Use "zoom-in" for dramatic close-ups. Use "zoom-out" for panoramic long shots. Also use zooming to focus manually or to decide the shooting angle. **(M-1)**
You can change the zooming speed. When you press the power zoom button firmly, the zooming speed gets faster, and when you press it softly, the speed gets slower.

(M-2)



Power Zooming

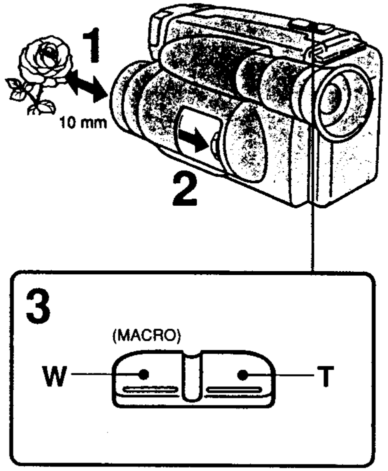
— For smooth and constant zooming (M-2)

Press the T side of the power zoom button for telephoto (subject appears closer) and the W side for wide-angle (subject appears farther away).

For more zooming effect
When you use VCL-0637A, VCL-1437A or VCL-TRA (a 37 mm conversion lens/not supplied), you can get more telephoto focus or wider angle.

Close-Up (Autofocusing in Macro)

(N-1)



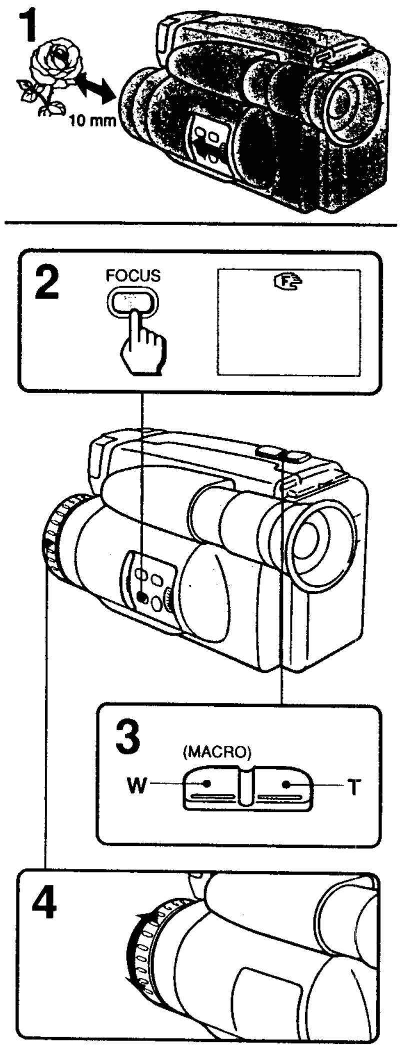
Even small subjects, such as flowers, insects, and images in photographs, can literally fill the screen using autofocusing in macro. **(N-1)**

1 **Bring the camcorder as close as necessary to obtain the desired subject size.**
The subject can be as close as a minimum of 10 mm (13/32 in.) from the lens surface.

2 **Close the AUTO LOCK cover.**

3 **Keep pressing the W (Macro) side of the power zoom button until the zooming stops (wide-angled).**

(N-2)



Manual focusing in Macro
(N-2)

1 **Slide open the AUTO LOCK cover.**

2 **Press FOCUS.**
The F(manual focusing) indication appears in the viewfinder.

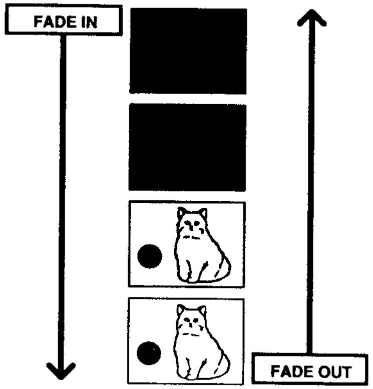
3 **Keep pressing the W side of the power zoom button until the zooming stops (wide-angle).**

4 **Turn the focus ring to achieve sharp focus.**

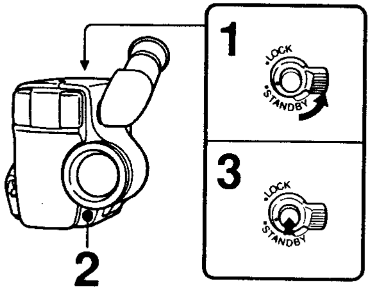
Recommended accessory
When shooting in macro, the depth of field is very shallow, so pay attention to focusing. To keep the subject in focus, use a tripod.

Note
Shoot the subject at the wide-angle position in macro. At the telephoto position, if the subject is closer than 1 m (3 ft. 3 3/8 in.), it cannot be brought into focus.

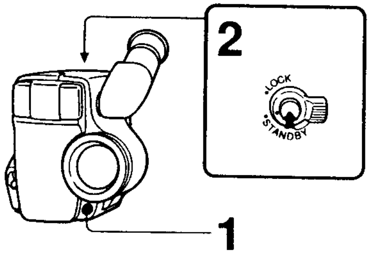
(O-1)



(O-2)



(O-3)



Fade-in and Fade-out

(O-1)
You can fade-in or fade-out to give your recording a professional appearance.
When fading-in, the picture will gradually appear from black. The sound will also gradually increase.
When fading-out, the picture will gradually fade to black. The sound will also gradually decrease.

To Fade-in
(O-2)

1 **Turn STANDBY up to set the camcorder in the standby mode.**

2 **Press FADER.**
The "FADER" indication appears in the viewfinder.

3 **Press START/STOP.**
The recording starts fading in.

To Fade-out
(O-3)

1 **While recording, press FADER.**
The "FADER" indication appears in the viewfinder.

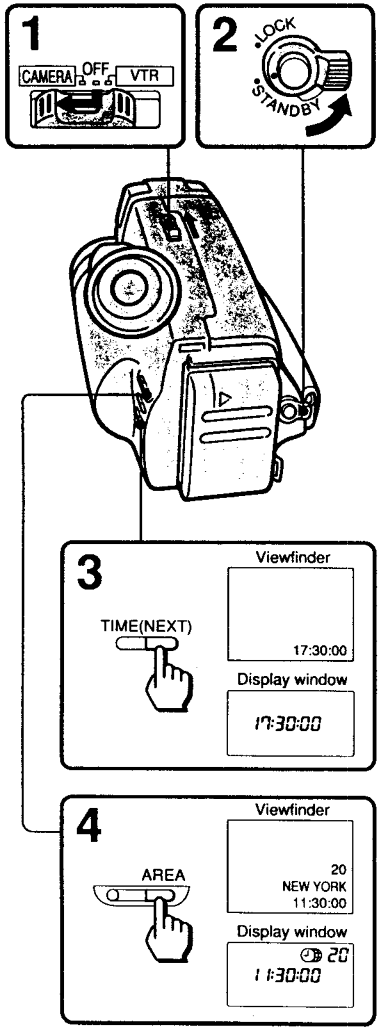
2 **Press START/STOP to stop the recording.**
Fade-out is performed and then recording stops.

To cancel the fade-in/fade-out function before it is performed
Before pressing START/STOP, press FADER again.

If you want to use the fade-in/fade-out function repeatedly
Start from step 1 each time.

Using the World Clock

(P-1)


1
CAMERA
OFF
VTR
2
LOCK
STANDBY
3
TIME(NEXT)
Viewfinder
17:30:00
Display window
17:30:00
4
AREA
Viewfinder
20
NEW YORK
11:30:00
Display window
20
11:30:00

This camcorder has a world clock. While traveling abroad, you can easily adjust to the time of the place where you are using the camcorder by pressing AREA.
Before pressing AREA, set the date and time in your country (see page 27). **(P-1)**

1 **While pressing the green button, set POWER to CAMERA.**

2 **Turn STANDBY up to set the camcorder in standby mode.**

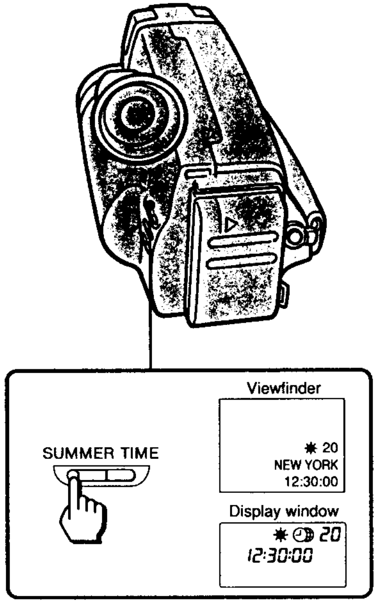
3 **Press TIME.**
The time in your country appears.

4 **Press AREA until the area name and number where you are now using the camcorder appear.**
The time where you are using the camcorder appears. The ⌚ indication appears in the display window. You can find the area name and number in the "Time zone chart" on page 54.

To check the date
Press DATE.
To turn off the date indication, press DATE again.

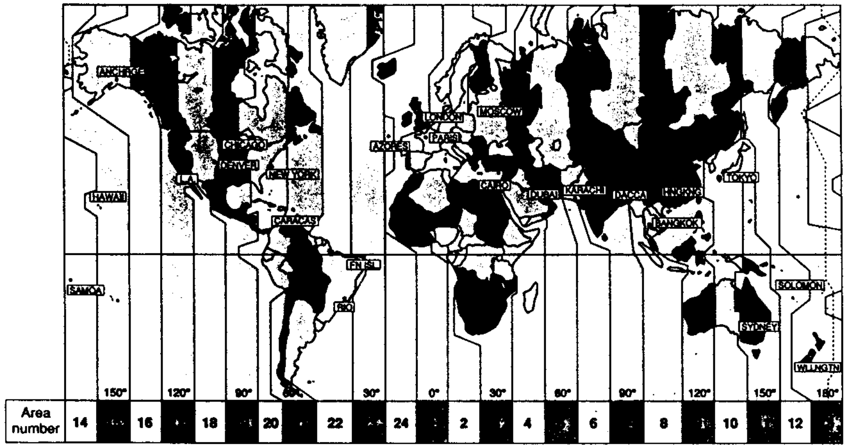
To reset to your country area time
Press AREA until your country area and number appears.

(P-2)


SUMMER TIME
Viewfinder
✱ 20
NEW YORK
12:30:00
Display window
✱ 20
12:30:00

To set summer time
Press SUMMER TIME. Time changes to summer time. Indication ✱ appears inside the viewfinder and in the display window. **(P-2)**
To set to standard time, press SUMMER TIME again.

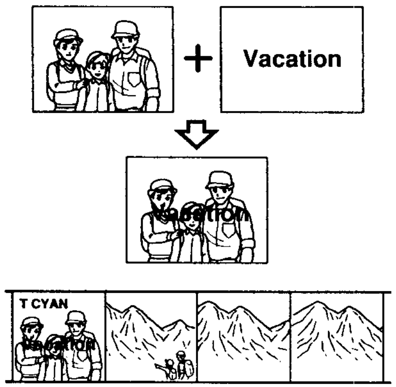
Time Zone Chart


ANCHRGE
HAWAII
L.A.
DENVER
CHICAGO
NEW YORK
CARACAS
SAMOA
FN ISL
RIO
AZORES
LONDON
PARIS
MOSCOW
CAIRO
DUBAI
KARACHI
DACCA
HNGKNG
BANGKOK
TOKYO
SOLOMON
SYDNEY
WLLNGTN
150°
120°
90°
60°
30°
0°
30°
60°
90°
120°
150°
180°
Area number
14
16
18
20
22
24
2
4
6
8
10
12

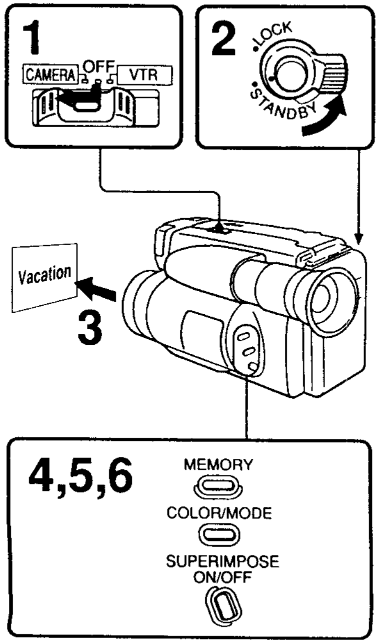
Area number	Area name	Countries or area*
1	LONDON	England, Morocco, Portugal, GMT (Greenwich Mean Time)
2	PARIS	Austria, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland, CST (Continental Standard Time), Tunisia
3	CAIRO	Egypt, Finland, Greece, Turkey
4	MOSCOW	Ethiopia, Iraq, Kenya, Mauritius, Saudi Arabia, Seychells, U.S.S.R. (Moscow)
5	DUBAI	United Arab Emirates
6	KARACHI	Moldives, Pakistan
7	DACCA	Bangladesh, India, Myanmar
8	BANGKOK	Cambodia, Indonesia (Jakarta), Thailand, Vietnam
9	HNGKNG	Australia (Perth), China, Hong Kong, Indonesia (Bali, Borneo), Malaysia, Philippines, Singapore, Taiwan
10	TOKYO	Japan, Korea
11	SYDNEY	Australia (Sydney)
12	SOLOMON	New Caledonia
13	WLLNGTN	Fiji, New Zealand
14	SAMOA	Western Samoa
15	HAWAII	Hawaii I., Tahiti, HST (Hawaii Standard Time)
16	ANCHRGE	U.S.A. (Alaska), AST (Alaska Standard Time)
17	L.A.	U.S.A. (Los Angeles, San Francisco), PST (Pacific Standard Time)
18	DENVER	U.S.A. (Denver), MST (Mountain Standard Time)
19	CHICAGO	U.S.A. (Chicago), Mexico, CST (Central Standard Time)
20	NEW YORK	Canada (Montreal), Jamaica, Peru, U.S.A. (New York, Washington D.C.), EST (East Standard Time)
21	CARACAS	Chile, Dominica, Venezuela
22	RIO	Argentina, Brazil, Uruguay
23	FN ISL.	Fernando de Noronha
24	AZORES	Azores Islands

• These are common names. The formal names may be different.

(Q-1)


Vacation
T CYAN

(Q-2)


1
CAMERA
OFF
VTR
2
LOCK
STANDBY
Vacation
3
4,5,6
MEMORY
COLOR/MODE
SUPERIMPOSE ON/OFF

Superimposing a Title

You can superimpose your own hand-written message or illustration (title) over the picture while you are recording. **(Q-1)**

- You can store one title.
- You can select the color of the title from 8 colors.
- Before recording, store the title.

Storing a Title

(Q-2)

Before storing

- Make the desired title card.
  Use a plain, white card and draw the title in thick, dark letters.
- Make sure the lithium battery is installed (page 25).

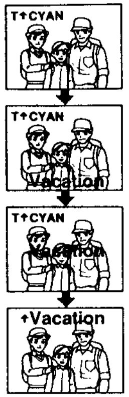
How to start

1. **While pressing the green button, set POWER to CAMERA.**
2. **Turn STANDBY up to set the camcorder in standby mode.**
3. **Point the camcorder to the title card and adjust the focus.**
   To focus on the subject, use the close-up function.
4. **Press MEMORY to store the title.**
5. **Press COLOR/MODE and select the title color.**
   Each time you press the button, the indication changes as follows.

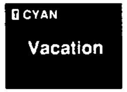
   WHT (white) → BLUE → GRN (green) → CYAN
   ↑ ↓
   BLK (black) ← YEL (yellow) ← VIO (violet) ← RED
6. **Press SUPERIMPOSE ON/OFF to turn off the title.**

To check the title
Press SUPERIMPOSE ON/OFF in the standby mode.
To turn off the title, press the button again.

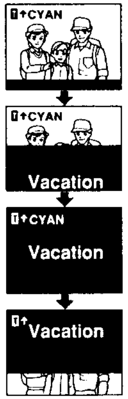
(Q-3)


T↑CYAN
T↑CYAN
Vacation
T↑CYAN
Vacation
↑Vacation

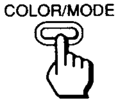
(Q-4)


T CYAN
Vacation

(Q-5)


T↑CYAN
T↑CYAN
Vacation
T↑CYAN
Vacation
T↑Vacation

(Q-6)



About memory back up
The camcorder uses a lithium battery (located on the bottom of the unit) to keep the title in memory. The lithium battery life is approximately 1 year.

Various Display Modes of the Title

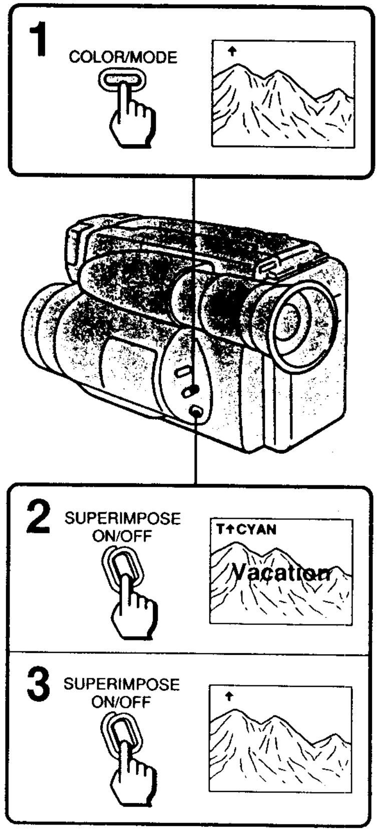
You can scroll your title like in the movies, or reverse the title.
Select the display mode of the title from the following table.

Display mode	Indication in the viewfinder
Scrolling up the title (Q-3) The title scrolls up.	↑
Reversing the title with the picture (Q-4)	T
Scrolling up the reversed title (Q-5)	T↑
Normal display mode	No Indication

Selecting the display mode
Before displaying the title, press COLOR/MODE until the indication of the mode you want appears. **(Q-6)**

After selecting the mode
Follow the procedure on page 58 to superimpose the title on the picture in that mode.

(Q-7)



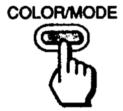
Superimposing a Title on Your Tape

The following shows how to superimpose a title using an example in which the title in cyan scrolls up. **(Q-7)**

1. **Press COLOR/MODE to select the display mode of the title in the standby mode.**
2. **Press SUPERIMPOSE ON/OFF at the point from which you want to insert the title during recording.**
   You can change the title color by pressing COLOR/MODE. Each time you press the button, the color indication changes.
3. **Wait for a while and press SUPERIMPOSE ON/OFF again.**
   The title goes out.

About the color and the display mode indications
The color and the display mode indications in the viewfinder are not recorded.

(Q-8)



Function of the COLOR/MODE Button

This button has a double function: one is to select the title color and the other is to select the title display mode. Its function depends on whether the title is displayed or not. **(Q-8)**

To select the color

1. **Press SUPERIMPOSE ON/OFF to display the title.**
2. **Press COLOR/MODE.**
   Each time you press the button, the color indication changes as follows:

WHT (white) → BLUE → GRN (green) → CYAN
↑ ↓
BLK (black) ← YEL (yellow) ← VIO (violet) ← RED

To select the mode

1. **If the title is displayed inside the viewfinder, press SUPERIMPOSE ON/OFF so that the title disappears.**
2. **Press COLOR/MODE.**
   Each time you press the button, the mode indication changes as follows:

No indication
(Normal title mode) → ↑ → T → T↑
↑________________|

↑ :Title scroll up mode
T :Title reverse mode
T↑ :Title reverse and scroll up mode

Connection for Playback

You must connect the camcorder and the TV and/or VTR properly to view the playback picture.
Check the following connecting examples and go to the appropriate section to make the necessary connections.

Case 1: Connecting the camcorder to a TV with video/audio input jacks.

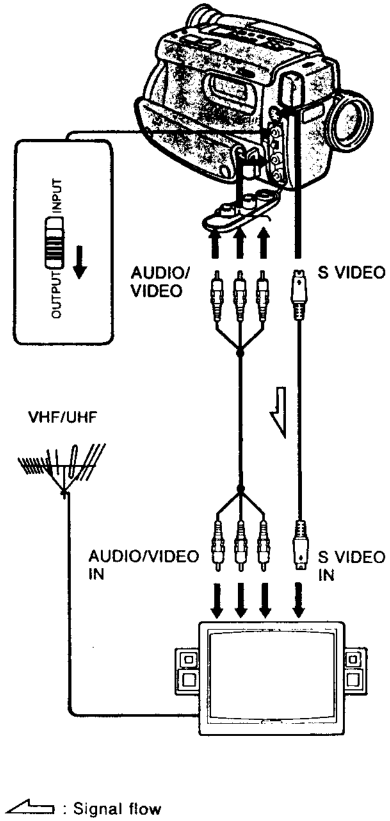
Case 2: Connecting the camcorder to a TV without video/audio input jacks.

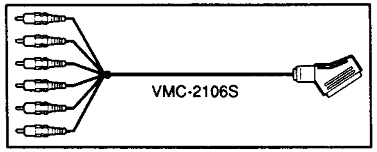
Case 3: Connecting the camcorder to a TV via a VTR.

About the AUDIO/VIDEO jacks
The AUDIO/VIDEO jacks on this camcorder works as both input and output jacks.
Set the INPUT/OUTPUT selector as follows.
(E/AUS MODEL)

in the OUTPUT position	to view the playback tape/ to edit on another VTR
in the INPUT position	to record from another VTR or TV

(R-1)





Case 1: Connecting to a TV with Video/Audio Input Jacks

(R-1)

Leave the TV aerial cable connected to the TV.

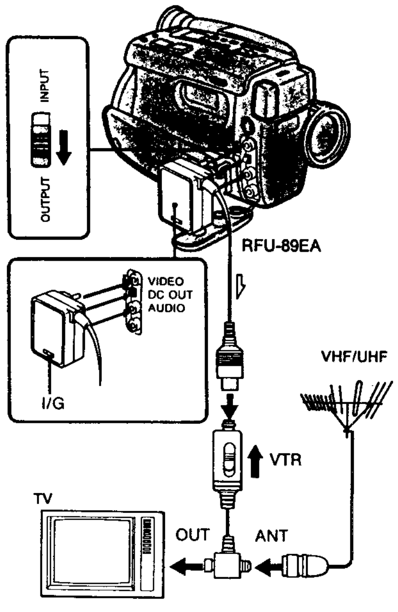
1 **Connect the camcorder to the TV using the supplied A/V connecting cable.**
   - **If your TV has an S video input jack,** connect the S video jack on the camcorder and the S video input jack on the TV using the S video connecting cable (supplied). In this case, you need not connect the yellow plug of the AV connecting cable.
   - **If your TV is a monaural type,** connect only the white plug for audio both on the camcorder and the TV. Set the HI-FI SOUND switch to the "green position". See "Selecting the Monitor Sound" on page 66.
   - **If your TV has a 21-pin connector (EUROCONNECTOR),** use a connecting cable such as the VMC-2106S (not supplied).

2 **Set the INPUT/OUTPUT selector on the Camcorder to OUTPUT. (E/AUS MODEL)**

3 **Set the TV/VTR selector button or switch on the TV to VTR.**

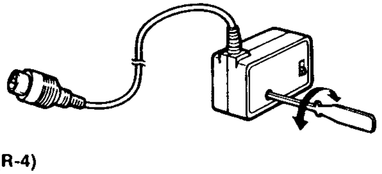
Notes
- For details on the TV, refer to the instruction manual of the TV.
- If your TV is a stereo type, the sound will be in stereo and when your TV is a monaural type, the sound will be in monaural.

(R-2)

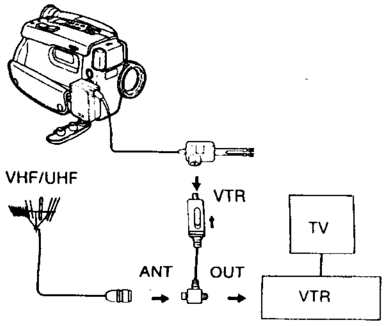


⊿ : Signal flow

(R-3)



(R-4)



Case 2: Connecting to a TV without Video/Audio Input Jacks

(R-2)

For the customers supplied with the RFU adaptor RFU-89EA

Before you begin
- Use the supplied RFU-89EA RFU adaptor.
- Make sure that the TV is turned off.
- Usually keep the RFU adaptor and the TV connected.

Connecting an RFU adaptor and a TV

1. Connect the RFU adaptor to the camcorder.
2. Set the INPUT/OUTPUT selector on the camcorder to OUTPUT. **(E/AUS MODEL)**
3. Connect the antenna selector supplied with the RFU adaptor to the VHF/UHF antenna and the TV.
4. Set the selector switch on the antenna selector to VTR.

Adjusting the TV

1. Set the I/G selector on the RFU adaptor according to the TV system used in your area.
2. Turn on the TV and select a program position that is not used to receive a TV station.
3. Set the POWER switch of the camcorder to CAMERA and turn STAND BY up.
4. Tune the TV so that the picture and the sound from the camcorder is received.

Note
For details on the TV, refer to the instruction manual of the TV.

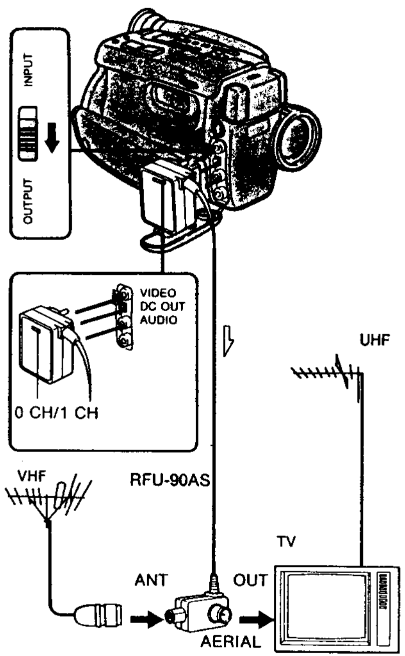
When the playback picture is not free of disturbance

1. Set the selector switch on the antenna selector to ANT.
2. Select a program position between UHF channels 30 and 39, so that the TV shows no picture and a steady restling sound or no sound is heard.
3. Set the selector switch on the antenna selector to VTR.
4. Turn the screw on the RFU adaptor slowly with the supplied screwdriver so that the playback picture is clearly displayed on the TV screen. (R-3)

If your TV is connected to a VTR (R-4)
Connect the camcorder to the VTR instead of the TV.

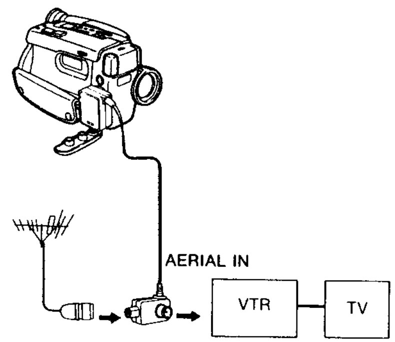
Note
In this connection, the sound will be in monaural.

(R-5)



⊿ : Signal flow

(R-6)



For the customers supplied with the RFU adaptor RFU-90AS

(R-5)

Before you begin
- Use the supplied RFU-90AS RFU adaptor.
- Make sure that the TV is turned off.
- Usually keep the RFU adaptor and the TV connected.

Connecting an RFU adaptor and a TV

1. Connect the RFU adaptor to the camcorder.
2. Set the INPUT/OUTPUT selector on the camcorder to OUTPUT. **(E/AUS MODEL)**

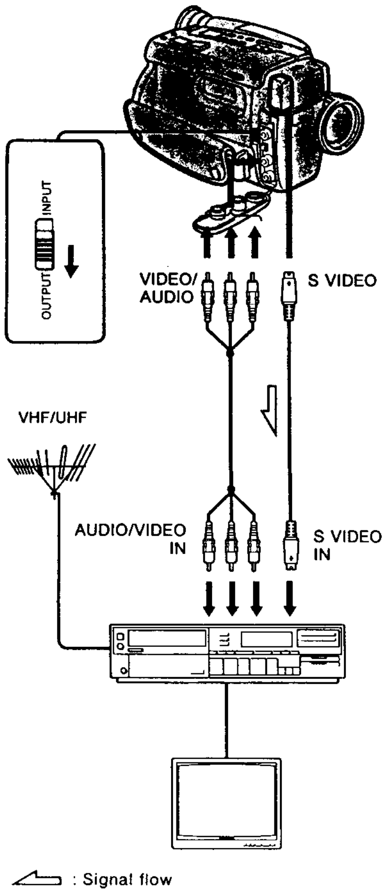
Adjusting the TV

1. Select the RF unit selector of the adaptor to 0CH or 1CH, whichever is not active in your area.
2. Turn on the TV and select the 0 position so that you can receive the camcorder's playback signal.

If your TV is connected to VTR
(R-6)
Connect the camcorder to the VTR instead of TV.

Notes
- Whenever playing back a tape, be sure to set the TV to the 0 position.
- In this connection, the sound will be in monaural.
- When you watch a TV program, turn off the camcorder or disconnect the RFU adaptor from the camcorder.

(R-7)



Case 3: Connecting to a TV via a VTR

(R-7)

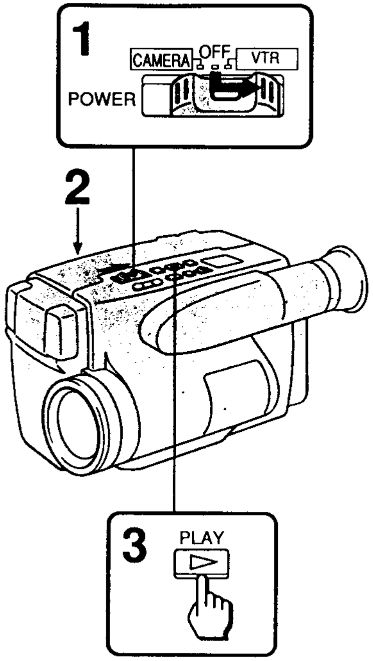
Leave the VTR aerial cable connected to the VTR.

1 **Connect the camcorder to the VTR using the supplied A/V connecting cable.**
- **If your VTR has an S video input jack**, connect the S video jack on the camcorder and the S video input jack on the VTR using the S video connection cable (supplied). In this case, you need not connect the yellow plug of the AV connecting cable.
- **If your VTR is a monaural type**, connect only the white plug for audio both on the camcorder and the VTR. Set the HI-FI SOUND switch to the "green position". See "Selecting the Monitor Sound" on page 66.

2 **Set the input selector on the VTR to LINE and set the TV/VTR selector on the TV to VTR.**

Note
If your VTR is a stereo type, the sound will be in stereo and when your VTR is a monaural type, the sound will be in monaural.

(S-1)



Playing Back a Tape

Turn on the TV, and select the channel for viewing a playback picture (set the TV/VTR selector to VTR). You can use the supplied Remote Commander.

(S-1)

1 **While pressing the green button, set the POWER switch to VTR.**

2 **Insert a tape.**

3 **Press ▷.**
Playback starts.

To view a still picture, press ❚❚ during playback.

To resume playback, press ❚❚ or ▷ again.

Note
When the still picture mode lasts for 5 minutes or more, the camcorder automatically enters the stop mode.

To rewind the tape, press ◀◀.

To advance the tape rapidly, press ▶▶.

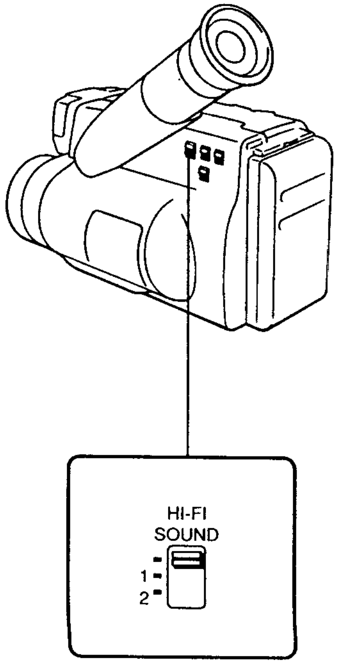
To stop the tape, press □.

To stop the tape momentarily, press ❚❚.

In playback pause mode, you can view the picture in a sequence of stop-motion images by pressing EDITSEARCH. If you keep pressing EDITSEARCH, you can view the picture playback in forward or reverse direction.

Note
Streaks appear and sound is muted in the still picture mode.

(S-2)



Monitoring a High-Speed Picture

To locate a scene (picture search)
Keep pressing ◀◀ or ▶▶ during playback.
You can monitor the picture at high speed as long as you keep pressing the button.
To resume normal playback, release the button.

To locate a scene quickly (skip scan)
Keep pressing ◀◀ during rewinding, or ▶▶ while advancing the tape rapidly.
You can monitor the picture at high speed as long as you keep pressing the button.
To resume a normal fast forwarding or rewinding, release the button.
To resume normal playback, press ▷.

Selecting the Monitor Sound

(S-2)

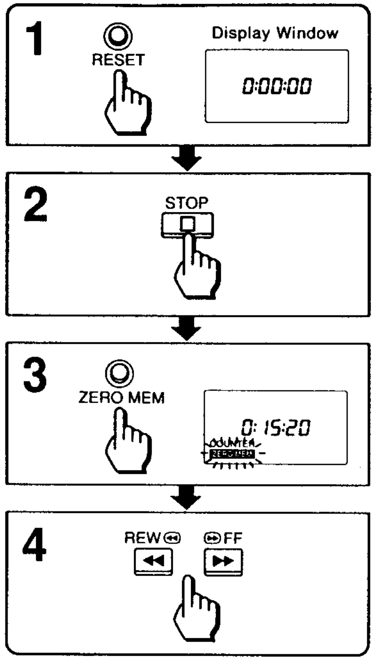
You can select the playback sound with the HI-FI SOUND switch.

When playing back a Hi-Fi stereo sound recorded tape
Set the switch to "Green position."

When playing back an AFM monaural sound recorded tape
Set the switch to "Green position."
Monaural sound comes from both audio jacks.

When playing back a dual soundtrack tape
Set switch to "1" or "2."

(T)



Using the Tape Counter

During recording or playback, the digits on the counter indicate the actual recording or playing time.

To Index the Whole Tape

(T)

Press RESET at the beginning of the tape so that the counter shows "0:00:00."
Write down the counter reading at a particular point so that you can easily find that point later by referring to the tape counter.

To Return to a Pre-registered Point

1 **During playback, press RESET at the point you later want to locate.**
The counter shows "0:00:00."

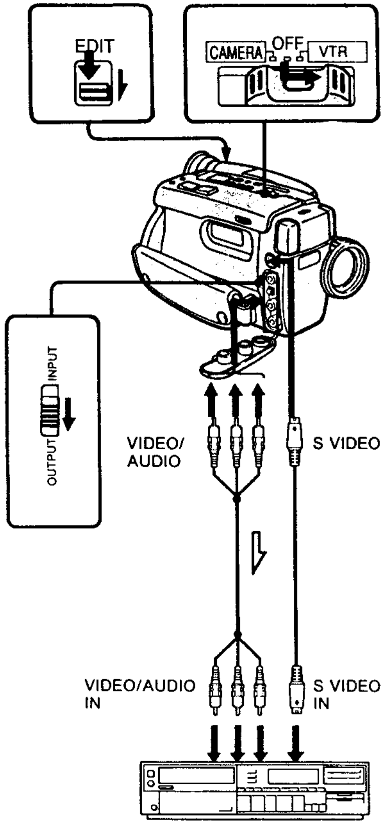
2 **Press □ when playback has finished, as usual.**

3 **Press ZERO MEM.**
The "ZERO MEM" indicator flashes in the display window.
Note
Be sure to press the ZERO MEM after you stop the tape. It does not function during recording or playback.

4 **Press ◀◀ or ▶▶.**
The tape rewinds or advances and stops automatically when the counter reaches approximately zero.

Notes on the tape counter and ZERO MEM
- The counter reading and the point on the tape may not correspond exactly. Use the counter as a guide. There will be a time lag of several seconds especially when you repeat fast-forwarding/rewinding and play back a tape recorded in LP and SP modes mixed.
- The ZERO MEM mode is cancelled automatically once the tape is rewound or sent forward to the point you pre-registered.

(U)



⊿ : Signal flow

Editing onto Another VTR

You can create your own video program by editing with any other 8 mm, Hi8 mm, Betamax, VHS, S-VHS, VHSC, S-VHSC VTRs that has video/audio inputs.

Before You Begin

- Make connections using the supplied Video/Audio connecting cable. **(U)**
- If your VTR has an S video input jack, connect the S VIDEO jack on the camcorder and the S video input jack on the VTR using the supplied S VIDEO connecting cable. In this case, you do not have to connect the yellow plug.
- Set the input selector of the VTR to LINE, if available.

Operation

1. Insert a tape to be recorded on into the recording VTR.
2. Move EDIT on the camcorder in the direction of the arrow. (EDIT ON)
3. Make sure that INPUT/OUTPUT is set to OUTPUT. (E/AUS MODEL)
4. Set POWER of the camcorder to VTR and insert your recorded tape.
5. Playback the tape on the camcorder and locate the point where you want to start editing and set the camcorder to the playback pause mode.
6. On the recording VTR, locate the recording start point and set the VTR to the recording pause mode.
7. Press II on the camcorder and on the VTR simultaneously to start editing.

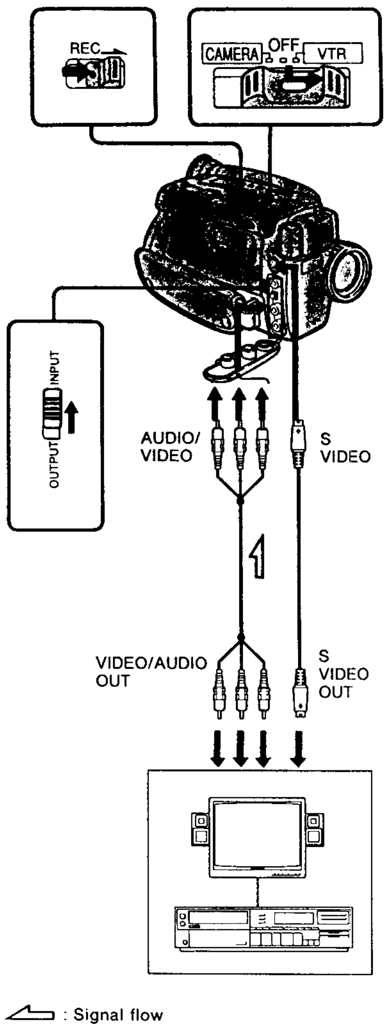
To stop editing momentarilly, press II on the VTR.

To edit more scenes, repeat steps 5 to 7.

To stop editing, press □ on the camcorder and on the VTR.

Use of the EDIT switch
When you set the EDIT switch in the direction of the arrow (EDIT ON), picture deterioration resulting from editing can be kept to a minimum. Don't use the edited tape for multiple generations of editing. After editing, move the EDIT switch in the opposite direction of the arrow (EDIT OFF).

(V)



Recording from Another VTR or a TV

(E/AUS MODEL)

(V)
You can record a tape from another VTR, or a TV program from the TV if both are equipped with video/audio outputs.

Before You Begin

- Disconnect the RFU adaptor from the camcorder if it has been connected.
- Make connections using the supplied A/V connecting cable.
- If your TV has an S video output jack, connect the S video jack on the camcorder and the S video output jack on the TV using the S video connecting cable (supplied). In this case, you do not need to connect the yellow (video) plug of the A/V connecting cable.
- If your TV is a monaural type, connect only the white plug for audio both on the camcorder and the TV or the VTR. Do not use the red plug. In this case, the sound will be in monaural.

Operation

1 Make sure that INPUT/OUTPUT is set to INPUT.

2 While pressing the small green button on POWER, slide POWER to VTR.

3 Insert a tape in the camcorder.

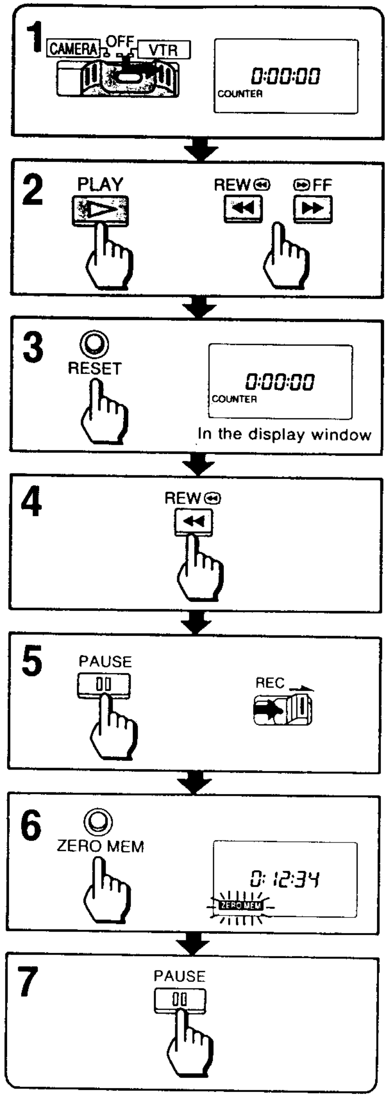
4 Turn on the VTR or TV.

5 Play back the tape (in another VTR) or select the TV channel to be recorded.

6 Slide ● REC in the direction of the arrow. Recording starts. You can monitor the picture being recorded inside the viewfinder.

Note
You can play back a tape in normal/reverse direction by keep pressing EDITSEARCH during recording standby or playback pause.
You can also play back still pictures successively at specific intervals by pressing EDITSEARCH intermittently.

(W)



Insert Editing

(E/AUS MODEL)

(W)
You can insert a new scene from a VTR onto your originally recorded tape by specifying starting and ending points.

Before You Begin

Connections are the same as in "Recording from another VTR or a TV" (page 60). Before you begin replacing recordings, set the VTR to the playback pause mode at the beginning of the scene to be recorded.

Operation

1 **While pressing the small green button on POWER, slide POWER to VTR.**
The counter appears in the display window.

2 **Locate the end point where the insert should end by pressing ◀◀ or ▶▶ during playback.**
The viewfinder screen shows a high-speed playback picture.

3 **At the end point, press RESET.**
The counter resets to "0:00:0."

4 **Locate the start point where the insert should begin by pressing ◀◀.**

5 **At the start point, put the camcorder into recording standby mode.**

6 **Press ZERO MEM.**
The end point of the insert is stored in memory.

7 **Press ⏸ on both the camcorder and the VTR to start insert editing.**
You can monitor the picture being inserted in the viewfinder screen. The insert recording stops automatically near the zero point on the counter.

To change the end point
Press ZERO MEM so that the ZERO MEM indication disappears, and begin from step 2.

Note
You can play back a tape in normal/reverse direction by keep pressing EDITSEARCH during recording standby or playback pause. You can also play back stll pictures successively at specific intervals by pressing EDITSEARCH intermittently.

Compatibility with Conventional 8 mm Camcorders

You can record and play back a high-quality picture on a tape for the Hi8 video system.

Recording with this camcorder

Hi8 tape Hi8

Set Hi8 AUTO/OFF to "AUTO". ➡ Tapes are recorded in the Hi8 video system.

Set Hi8 AUTO/OFF to "OFF". ➡ Tapes are recorded in the standard 8 mm video system.

Standard 8 mm tape 8

Regardless of the position of the Hi8 AUTO/OFF switch. ➡ Tapes are recorded in the standard 8 mm video system.

Playback with this unit

Tapes are recorded in the Hi8 video system.

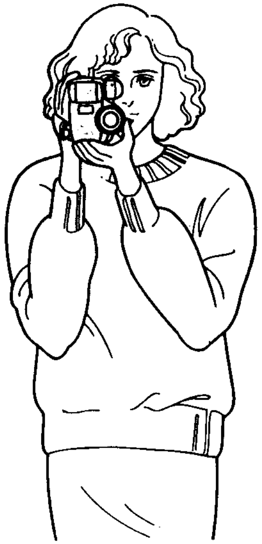
Tapes are recorded in the standard 8 mm video system.

} ➡ The recording mode is selected automatically.

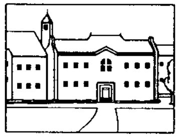
- A tape recorded in the Hi8 video system cannot be played back with a conventional 8 mm camcorder.
- A standard 8 mm tape 8 cannot be recorded in the Hi8 video system.
- A tape for the Hi8 video system Hi8 cannot be recorded and played back in the Hi8 video system with a conventional camcorder.
- The recording tape speeds in the Hi8 video system are compatible with the conventional 8 mm format.
  Recording/playback time in the SP mode is 1.5 hours using a E5-90/P5-90 tape or the equivalent.

Cassette used	**With this camcorder**		
	Recording		**Playback**
	Hi8	**Normal**	
Standard 8 mm tape 8	No	Yes	Yes
Hi8 tape Hi8	Yes	Yes	Yes

(X-1)



(X-2)



Hints for Better Shooting

Getting Stable Pictures

Assume good posture for shooting (X-1)
For hand-held shots, it is important to hold the camcorder properly.

- Hold the camcorder firmly and secure it with the grip strap so that you can easily manipulate the camcorder with your thumb.
- Place your right elbow against your side.
- Place your left hand under the camcorder to support it. When adjusting the focus manually, make sure the camcorder does not move.
- Place your eye firmly against the viewfinder eyecup.

Use a tripod
If you have a tripod for a still camera, it can also be used with the camcorder. If a tripod is not available, try placing the camcorder on a table top or any other flat surface of suitable height.

Keep the horizontal plane level (X-2)
The horizontal plane can be easily determined by using the viewfinder frame as a reference.

Planning Ahead

If you are going to edit the tape after recording
Shoot the scene a little longer to make the editing easier.

If you are not going to edit the tape after recording
First record a title and then use the START/STOP button to make a smooth recording.

Lighting

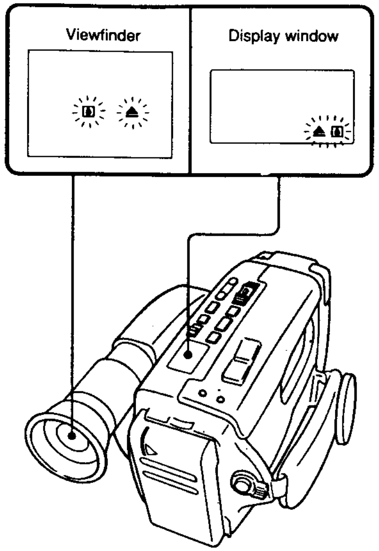
Shoot with the sun behind you
When the light source is behind the subject, or in the following situations, the subject will be recorded too dark and the background too light.
- The subject is indoors and there is a window behind the subject.
- Bright light sources such as fluorescent or incandescent lamps are included in the scene.
- You are shooting a person wearing white or shiny clothes in front of a white background. In this case, the face will be recorded too dark.

Use video light in the dark
To get the best colors, a sufficient light level must be maintained.
We recommend you use photography lamps or halogen lamps. For best results, use of Sony video lights are recommended because of their weight, low heat output levels.
When using a video light, attach it to this camcorder with a video light attachment (not supplied). For detailed instructions on proper use of light, read the instruction manual of the video light.

Notes and Precautions

Notes on Moisture Condensation

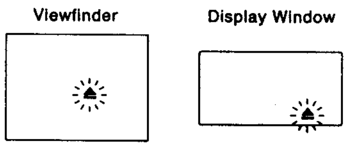
(Y-1)



If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or the camcorder may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with a moisture sensor. However, take the following precautions:

If moisture condenses inside the camcorder (Y-1)
When the ▣ and ⏏ indications inside the viewfinder and in the display window flash, moisture has condensed inside the camcorder. In this case, no function except for cassette ejection will work.
Eject the tape, turn off the camcorder, and leave it with the cassette holder open for about 1 hour.
The camcorder can be used again if the ▣ indication does not appear when the power is turned on again.

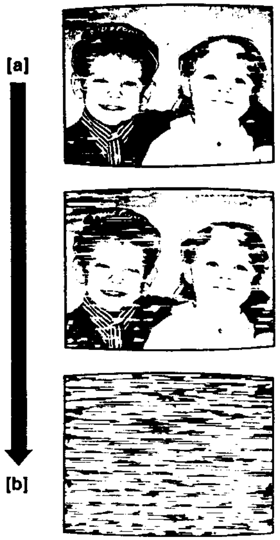
(Y-2)



If moisture condenses on the surface of the tape (Y-2)
If moisture is present on the surface of the tape when the tape is inserted and a tape transport button (▷ , ▶▶ , etc.) is pressed, the ⏏ indication flashes inside the viewfinder and in the display window.
In such a case, no function except for tape ejection will work.
Eject the tape and let it sit for about 1 hour.
The tape can be used again if the ⏏ indication does not appear when the tape is inserted and a tape transport button is pressed.

If moisture condenses on the lens
No indications will appear, but the picture becomes dim.
Turn off the power and leave the camcorder unused for about 1 hour.

(Y-3)



Notes on Video Head Cleaning

(Y-3)

To ensure clear pictures, clean the video heads periodically.
When playback pictures are noisy or hardly visible, the video heads may be contaminated.
[a] Slight contamination
[b] Critical contamination
In such cases,

1. Clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied), referring to its instructions.
2. After cleaning, check if the picture is clear by recording or playing back with an ordinary tape.
3. If the picture is still noisy, repeat cleaning. (Do not repeat cleaning more than 5 times.)

Caution
Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Note
If the V8-25CLH cleaning cassette is not available in your area, consult your Sony service facility.

Precautions

On operation

- Operate the camcorder on 6.0 V (battery pack), 7.5 V (AC power adaptor), or 9.0 V (alkaline batteries).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the casing, unplug the camcorder and have it checked by qualified personnel before operating it any further.
- Do not hold the camcorder by the viewfinder.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the lens cap on the lens when not using the camera.
- Do not wrap the camcorder and operate it because heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.
- **Do not let sand get into the camcorder. When you use the camcorder on a sandy beach or in dusty place, protect it from the sand or dust. Sand or dust may cause the unit to malfunction and sometimes the malfunction cannot be repaired.**
- **Do not let the camcorder get wet. Keep the camcorder away from rain or sea water. It may cause malfunction and sometimes the malfunction cannot be repaired.**

On care

- When the unit is not to be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera section and player section, and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on it, wipe them off with a soft cloth.
- Clean the camcorder body with a dry, soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

Note on copyright
Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

Using Your Camcorder Abroad

Each country has its own electricity system and TV color system. Before using your camcorder abroad, check the following points.

Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 100 V to 240 V AC, 50/60Hz.

Difference in Color Systems

You can view the playback picture in the viewfinder. However, if you want to view the playback picture on a TV, it must be a PAL system based TV as this is a PAL system based camcorder. (Note that Sony also makes NTSC system based camcorders.) Check the alphabetical list following.

PAL system countries
Australia, Austria, Belgium, China, Denmark, Finland, Germany (former West Germany), Great Britain, Holland, Hong Kong, Italy, Kuwait, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

PAL-M system country
Brazil

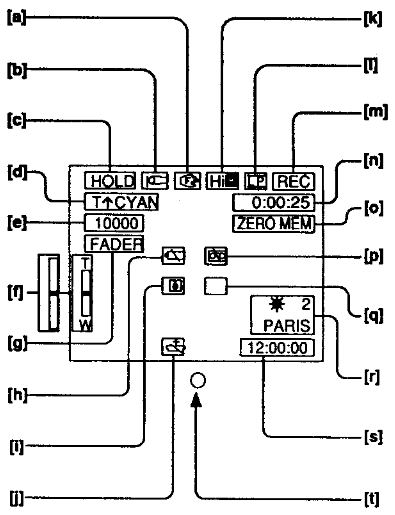
PAL-N system countries
Argentina, Paraguay, Uruguay

NTSC system countries
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, The Phillippines, U.S.A., Venezuela, etc.

SECAM system countries
Bulgaria, France, Guiana, Hungary, Iran, Iraq, Monaco, Poland, Soviet Union, etc.

Indications in the Viewfinder and the Display Window

(Z-1)



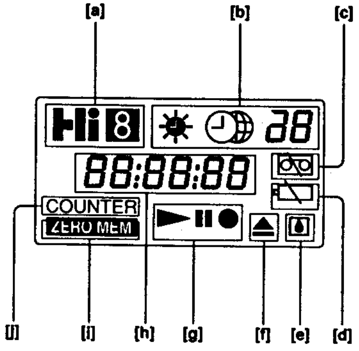
In the Viewfinder

(Z-1)

[a] Manual focusing
[b] WIND is selected. (⊂⊃)
[c] White balance mode (☼ / ☼ /HOLD)
[d] Title mode
[e] Shutter speed
[f] Power zoom indicator / Exposure indication
[g] FADER is pressed.
[h] "Replace battery."
[i] "Moisture has condensed."
[j] "Replace lithium battery."
[k] Lights up during recording in Hi8 system.
[l] Recording/Playback mode (LP/SP)
[m] Tape transport and camera recording mode
[n] Tape counter
[o] ZERO MEM is pressed.
[p] "Exchange tape or no cassette inside."
[q] "Clean video heads." or other caution (⊗ , ⏏)
[r] World clock indication
[s] Date or time
**[t] Shows up during recording.
When flashing: "Replace battery."**

Notes on DEMONSTRATION mode
When you set POWER to CAMERA while pressing □ and ▯▯ simultaneously, the "DEMO" indication appears in the viewfinder or on a TV screen if connected and the camcorder automatically demonstrates area names, area numbers, and title modes. You can monitor the sequence inside the viewfinder or on a TV screen if connected.
To turn off the demonstration indication, set POWER to OFF or VTR.

(Z-2)



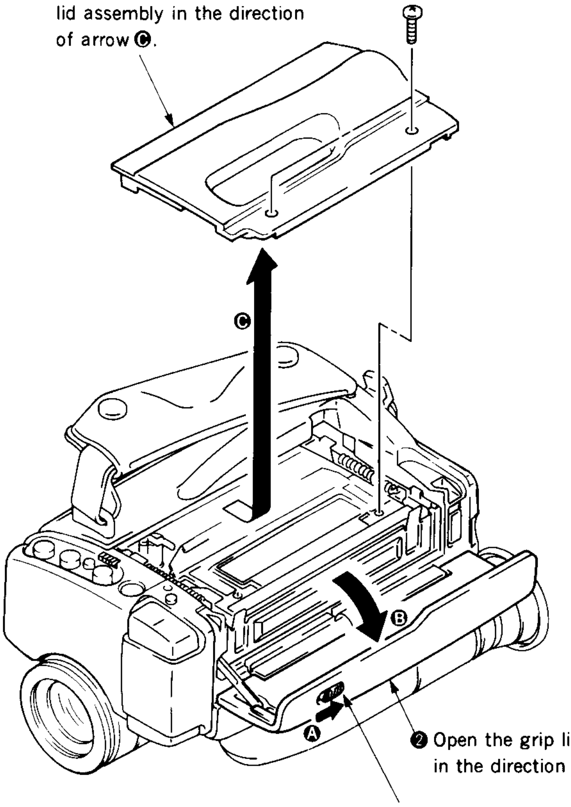
Display Window

(Z-2)

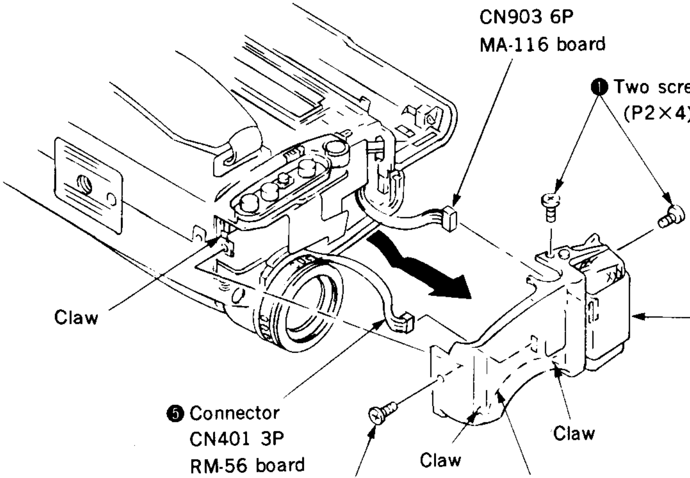
[a] Playing back or recording with Hi8 system.
[b] World clock indication
[c] "Exchange tape or no cassette inside."
[d] "Exchange battery."
[e] "Moisture has condensed."
[f] "Trouble has occurred."
[g] Tape transport indications
  ► playing back
  ❚❚ pausing
  ● recording
[h] Date, time, or tape counter
[i] ZERO MEM is pressed.
[j] Tape counter indication

SECTION 2
DISASSEMBLY

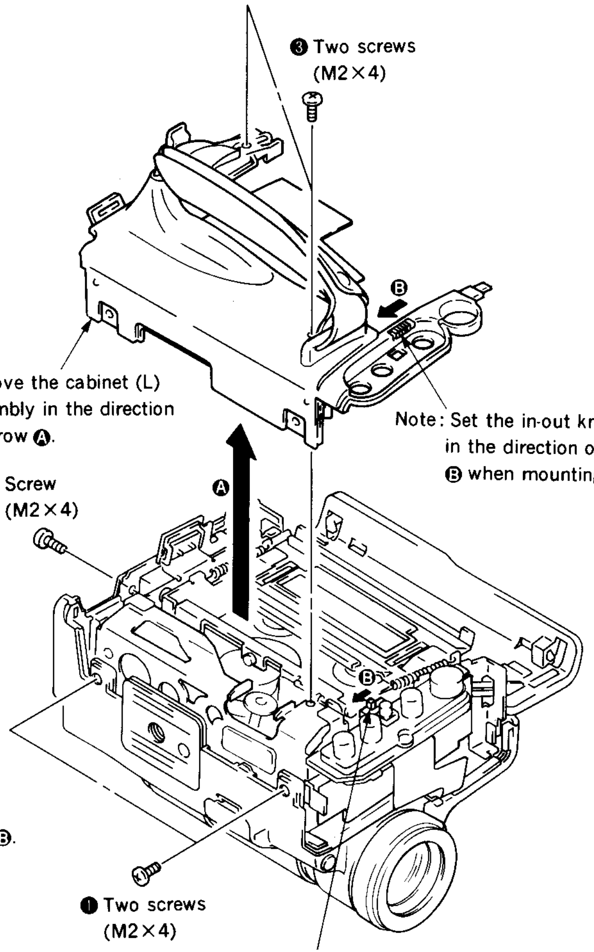
2-1. REMOVAL OF CASSETTE LID ASSEMBLY


❹ Remove the cassette lid assembly in the direction of arrow Ⓒ.
❸ Two screws (special screw M1.4)
Ⓒ
Ⓑ
Ⓐ
❷ Open the grip lid in the direction of arrow Ⓑ.
❶ Keep the lock button setting in the direction of arrow Ⓐ.

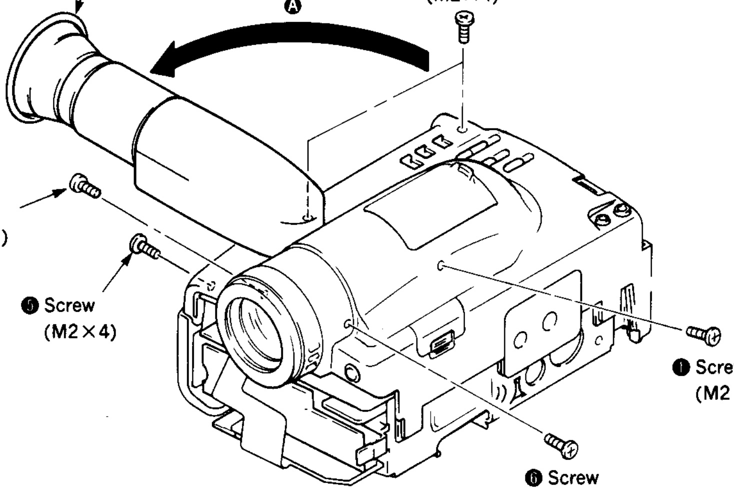
2-2. REMOVAL OF F PANEL ASSEMBLY


❹ Connector
CN903 6P
MA-116 board
❶ Two screws (P2×4)
Claw
❸ Remove the F panel assembly in the direction of arrow.
(Since the rib touch the lens section, remove as turning in the direction of the cabinet (R).)
❺ Connector
CN401 3P
RM-56 board
Claw
Claw
Rib
❷ Screw (P2×4)

2-3. REMOVAL OF CABINET (L) ASSEMBLY


❸ Two screws (M2×4)
Ⓑ
❹ Remove the cabinet (L) assembly in the direction of arrow Ⓐ.
Note: Set the in-out knob in the direction of arrow Ⓑ when mounting.
❷ Screw (M2×4)
Ⓐ
Ⓑ
❶ Two screws (M2×4)
Note: Set the slide switch in the direction of arrow Ⓑ when mounting and confirm that the in-out knob slides after fitting.

2-4. REMOVAL OF CABINET (R) ASSEMBLY



❷ Remove the EVF assembly in the direction of arrow Ⓐ.

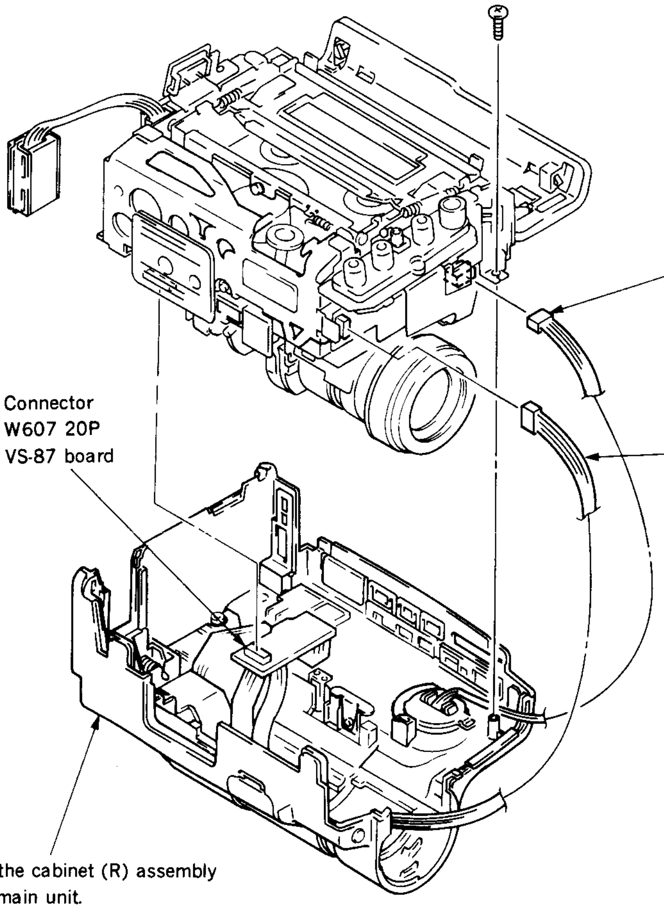
❸ Two screws (M2×4)

❹ Screw (BTP2)

❺ Screw (M2×4)

❶ Screw (M2×4)

❻ Screw (BTP2)



❼ Screw (BTP2)

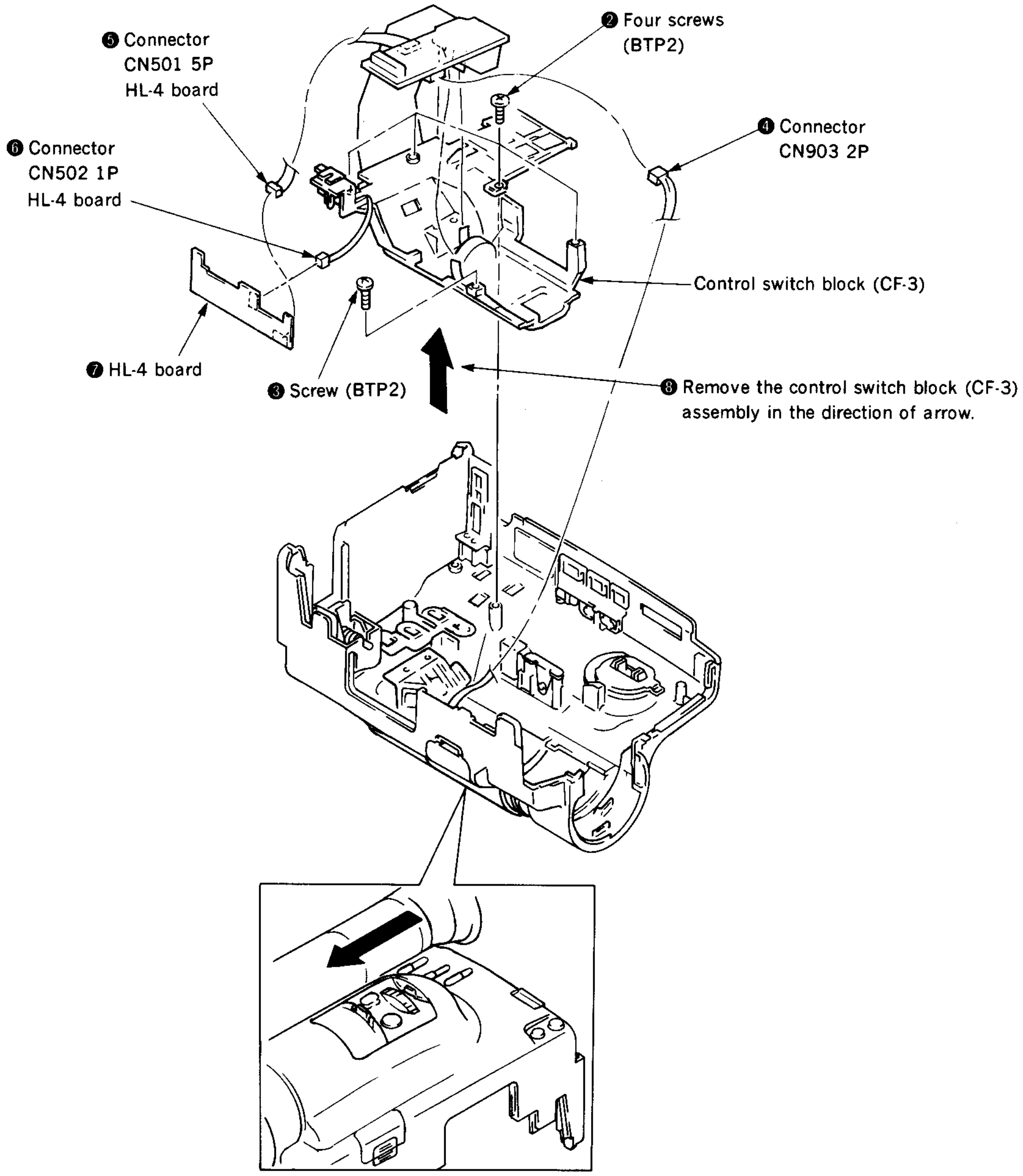
❾ Connector CN301 4P VS-87 board

⓫ Connector W607 20P VS-87 board

❿ Connector CN803 3P AU-121 board

❽ Separate the cabinet (R) assembly from the main unit.

2-5. REMOVAL OF CONTROL SWITCH BLOCK(CF-3)

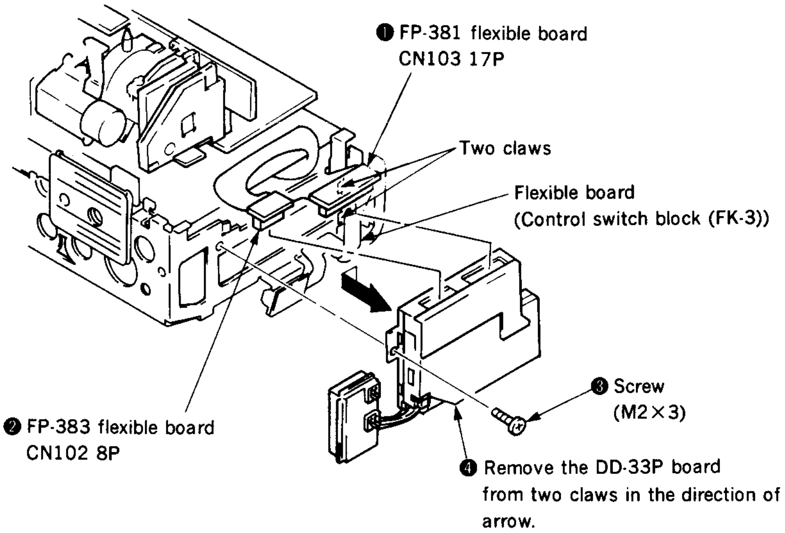

❺ Connector
CN501 5P
HL-4 board
❷ Four screws
(BTP2)
❹ Connector
CN903 2P
❻ Connector
CN502 1P
HL-4 board
Control switch block (CF-3)
❼ HL-4 board
❸ Screw (BTP2)

❽ Remove the control switch block (CF-3) assembly in the direction of arrow.

❶ Move the slide lid in the direction of arrow.

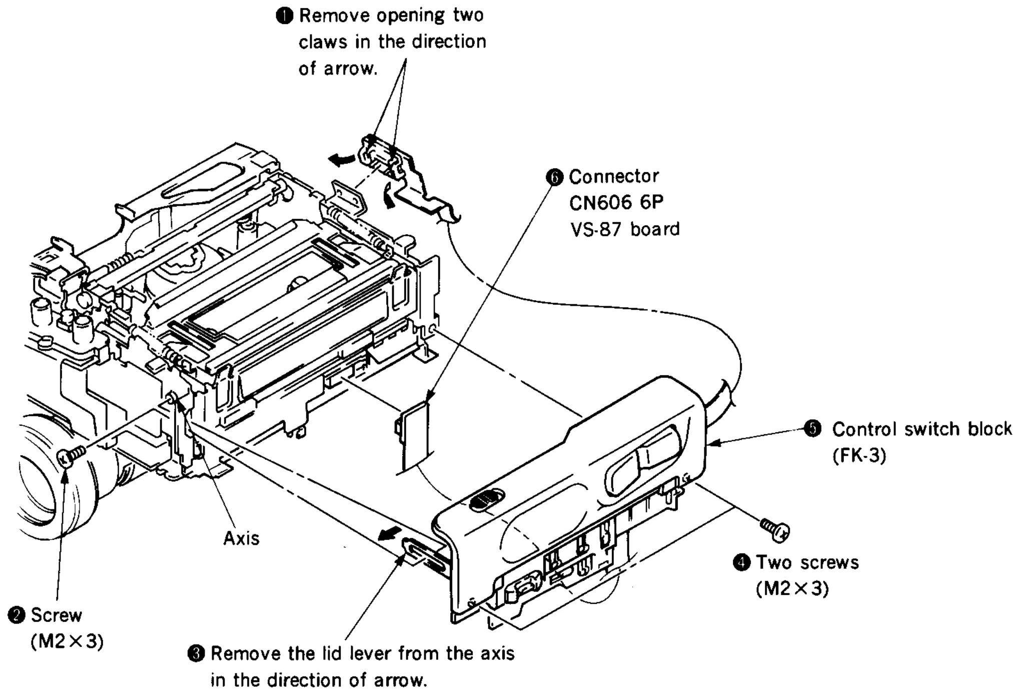
2-6. REMOVAL OF DD-33P BOARD

Note: Take care not to damage the flexible board of the control switch block (FK-3) when removing the DD-33P board.

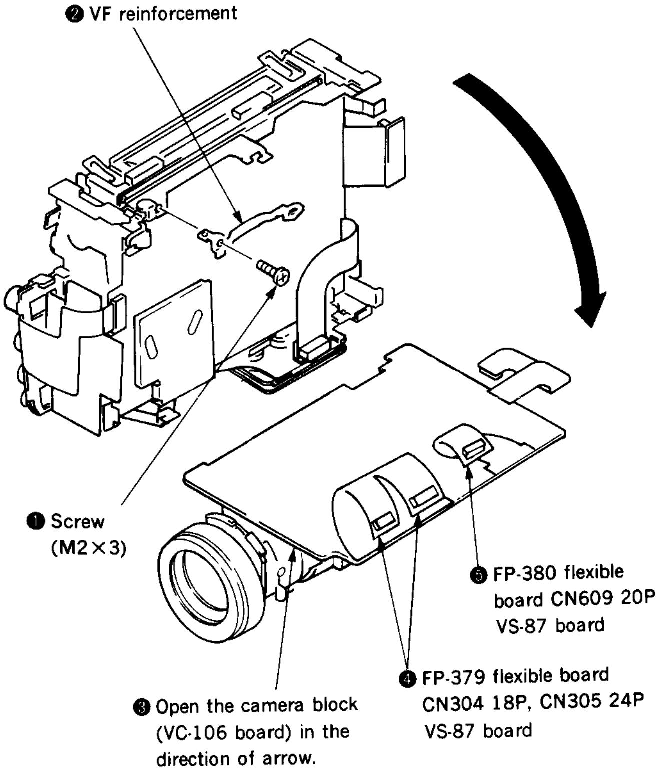

❶ FP-381 flexible board
CN103 17P
Two claws
Flexible board
(Control switch block (FK-3))
❸ Screw
(M2×3)
❷ FP-383 flexible board
CN102 8P

❹ Remove the DD-33P board from two claws in the direction of arrow.

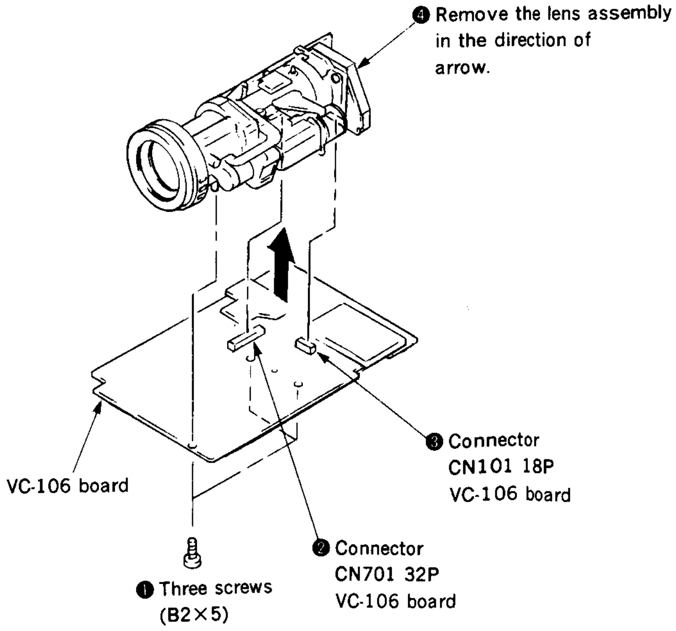
2-7. REMOVAL OF CONTROL SWITCH BLOCK(FK-3)


❶ Remove opening two claws in the direction of arrow.
❻ Connector CN606 6P VS-87 board
❺ Control switch block (FK-3)
❹ Two screws (M2×3)
Axis
❷ Screw (M2×3)
❸ Remove the lid lever from the axis in the direction of arrow.

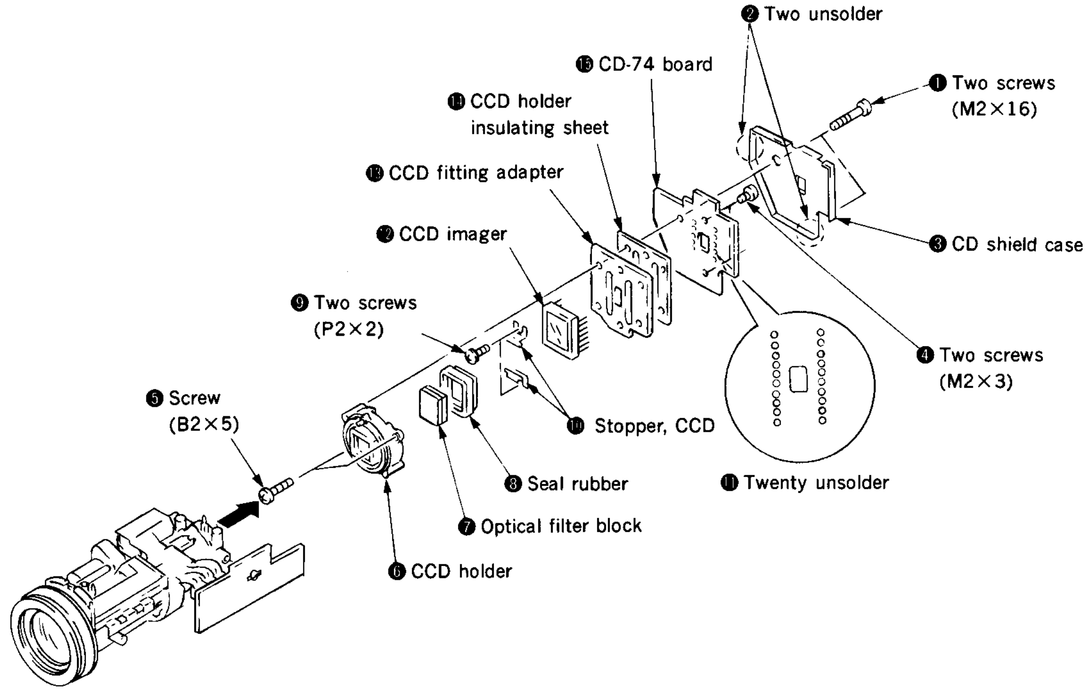
2-8. REMOVAL OF CAMERA BLOCK (VC-106 BOARD)


❷ VF reinforcement
❶ Screw (M2×3)
❺ FP-380 flexible board CN609 20P VS-87 board
❹ FP-379 flexible board CN304 18P, CN305 24P VS-87 board
❸ Open the camera block (VC-106 board) in the direction of arrow.

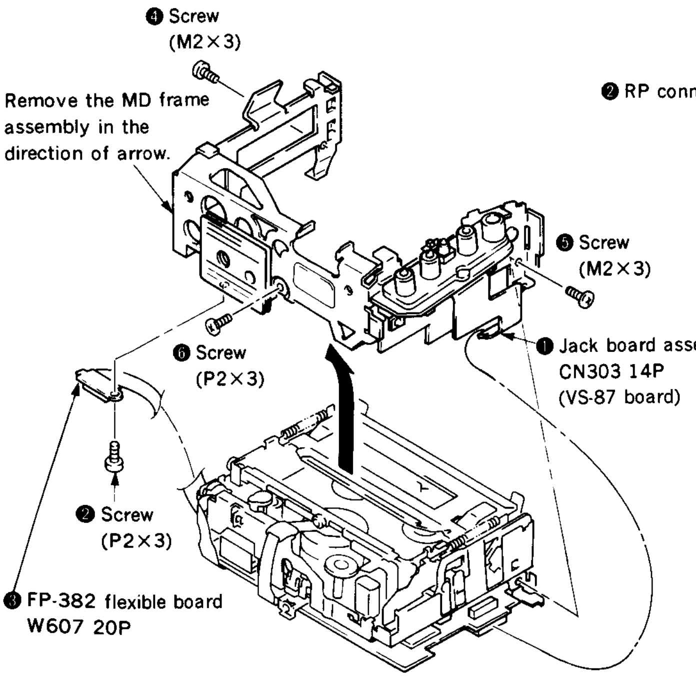
2-9. REMOVAL OF LENS ASSEMBLY


❹ Remove the lens assembly in the direction of arrow.
❸ Connector CN101 18P VC-106 board
VC-106 board
❷ Connector CN701 32P VC-106 board
❶ Three screws (B2×5)

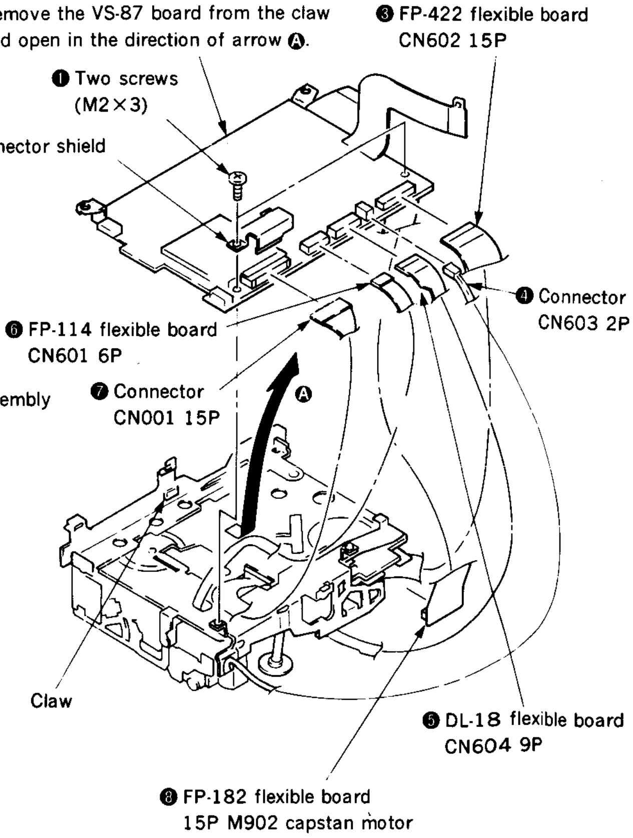
2-10. REMOVAL OF CCD IMAGER (CD-74 BOARD)


❷ Two unsolder
⓯ CD-74 board
❶ Two screws (M2×16)
⓮ CCD holder insulating sheet
⓭ CCD fitting adapter
❸ CD shield case
⓬ CCD imager
❾ Two screws (P2×2)
❹ Two screws (M2×3)
❺ Screw (B2×5)
❿ Stopper, CCD
❽ Seal rubber
⓫ Twenty unsolder
❼ Optical filter block
❻ CCD holder

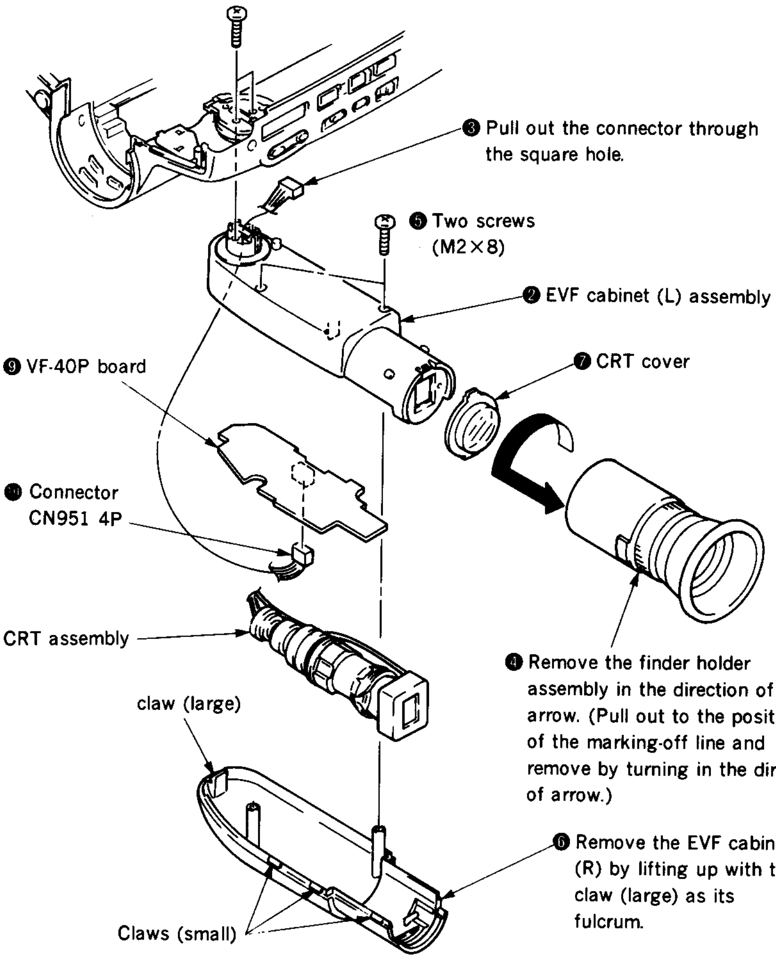
2-11. REMOVAL OF MD FRAME ASSEMBLY


❹ Screw (M2×3)
❼ Remove the MD frame assembly in the direction of arrow.
❺ Screw (M2×3)
❻ Screw (P2×3)
❶ Jack board assembly CN303 14P (VS-87 board)
❷ Screw (P2×3)
❸ FP-382 flexible board W607 20P

2-12. REMOVAL OF VS-87 BOARD


❾ Remove the VS-87 board from the claw and open in the direction of arrow Ⓐ.
❸ FP-422 flexible board CN602 15P
❶ Two screws (M2×3)
❷ RP connector shield
❹ Connector CN603 2P
❻ FP-114 flexible board CN601 6P
❼ Connector CN001 15P
Ⓐ
Claw
❺ DL-18 flexible board CN604 9P
❽ FP-182 flexible board 15P M902 capstan motor

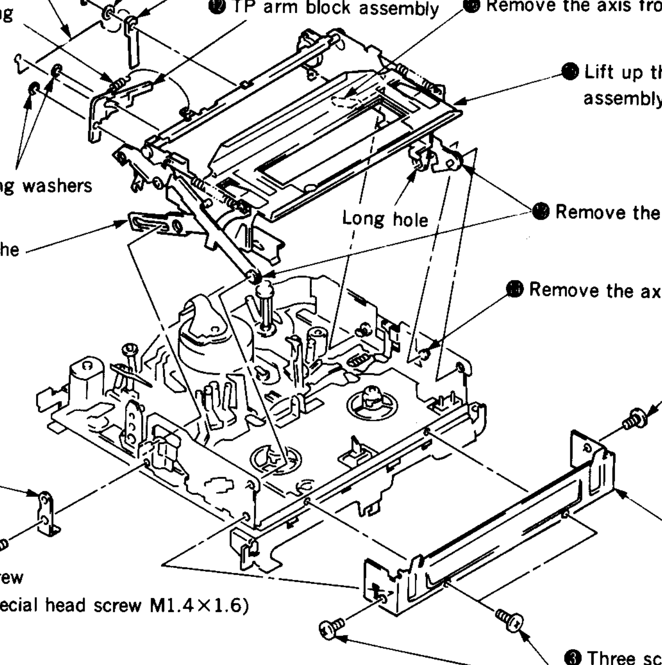
2-13. REMOVAL OF EVF ASSEMBLY


❶ Two screws (M2×10)
❸ Pull out the connector through the square hole.
❺ Two screws (M2×8)
❷ EVF cabinet (L) assembly
❼ CRT cover
❾ VF-40P board
❿ Connector CN951 4P
❽ CRT assembly
claw (large)
❹ Remove the finder holder assembly in the direction of arrow. (Pull out to the position of the marking-off line and remove by turning in the direction of arrow.)
❻ Remove the EVF cabinet (R) by lifting up with the claw (large) as its fulcrum.
Claws (small)

2-14. REMOVAL OF CASSETTE COMPARTMENT HOLDER ASSEMBLY

Note: In the beginning set to USE mode.

(When setting to USE mode, see "1-4. Handling of Mode Selector" in "8 mm video mechanical adjustment manual II FL Mechanism (Q mechanism) ".)

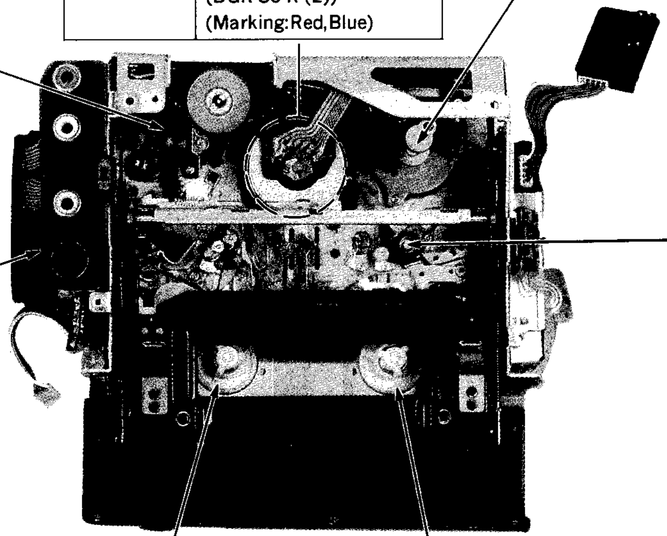

❻ Fastening washer
❼ Washer
❽ Joint bar
❾ T protector assembly
⓫ Tension coil spring
⓬ TP arm block assembly
⓰ Remove the axis from the long hole.
⓲ Lift up the cassette compartment holder assembly to the drum side.
❿ Two fastening washers
Long hole
⓭ Remove the axes from the holes.
⓱ Remove the axis from the long hole
⓮ Remove the axis from the long hole.
❹ Screw (Special head screw M1.4×1.6)
❷ LS support
❺ LS frame (2)
❶ Screw (special head screw M1.4×1.6)
❸ Three screws (Special head screw M1.4×1.6)

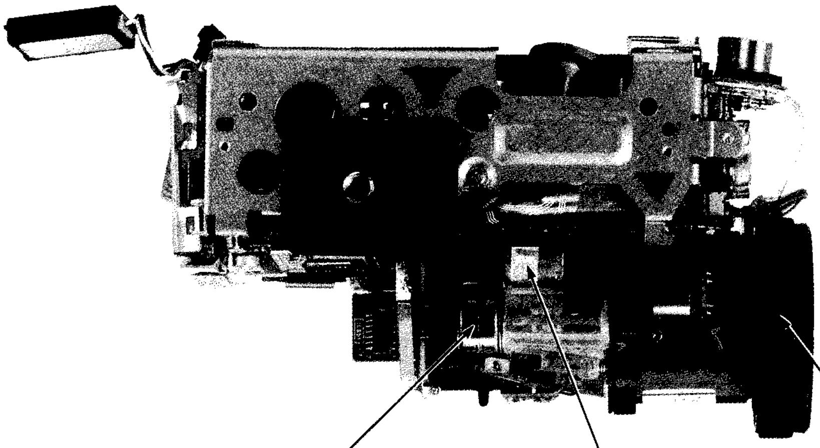
2-15. INTERNAL VIEWS

—Right side—

M901

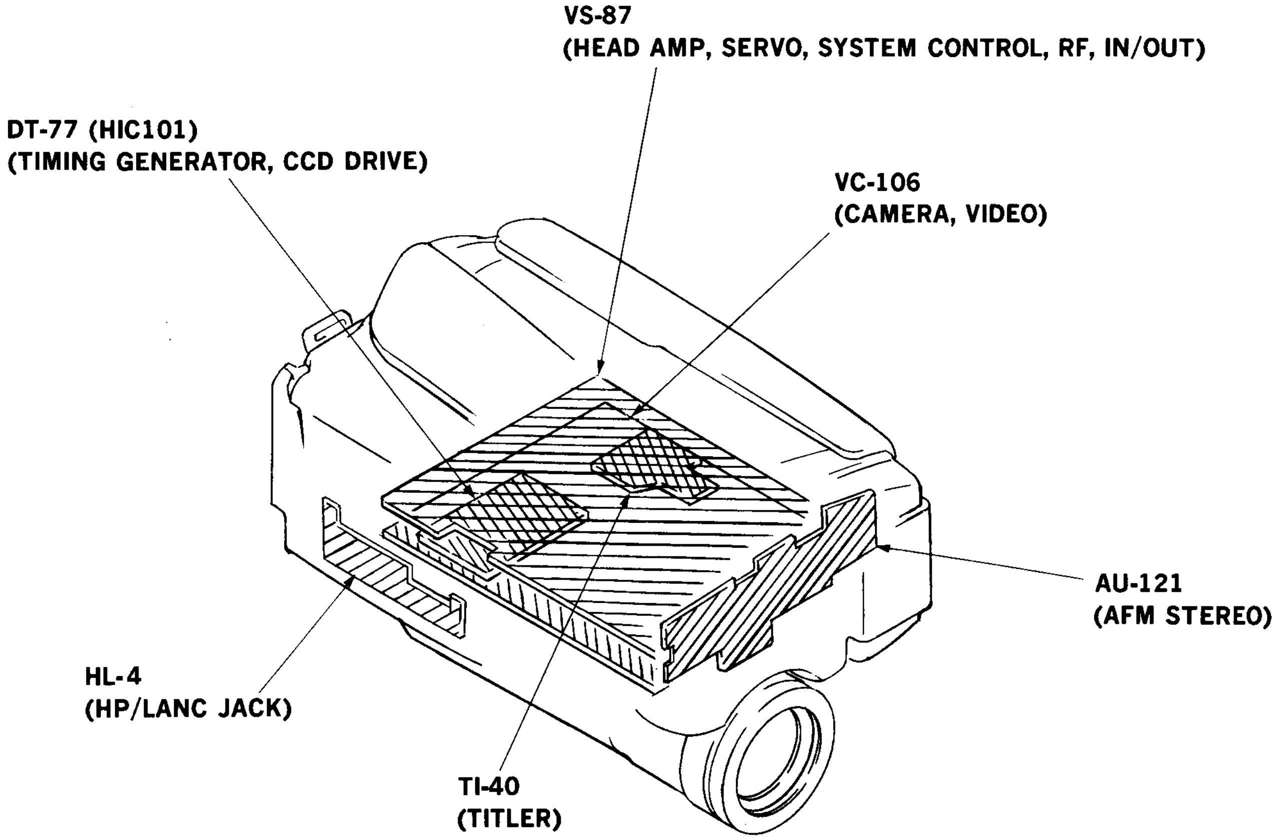
Drum assy	A-7048-534-A (DGH-80A-R)
Drum upper	A-7049-461-A (DGR-80-R-(1)) (Marking:Green/Red, Black)
	A-7049-464-A (DGR-80-R-(2)) (Marking:Red,Blue)

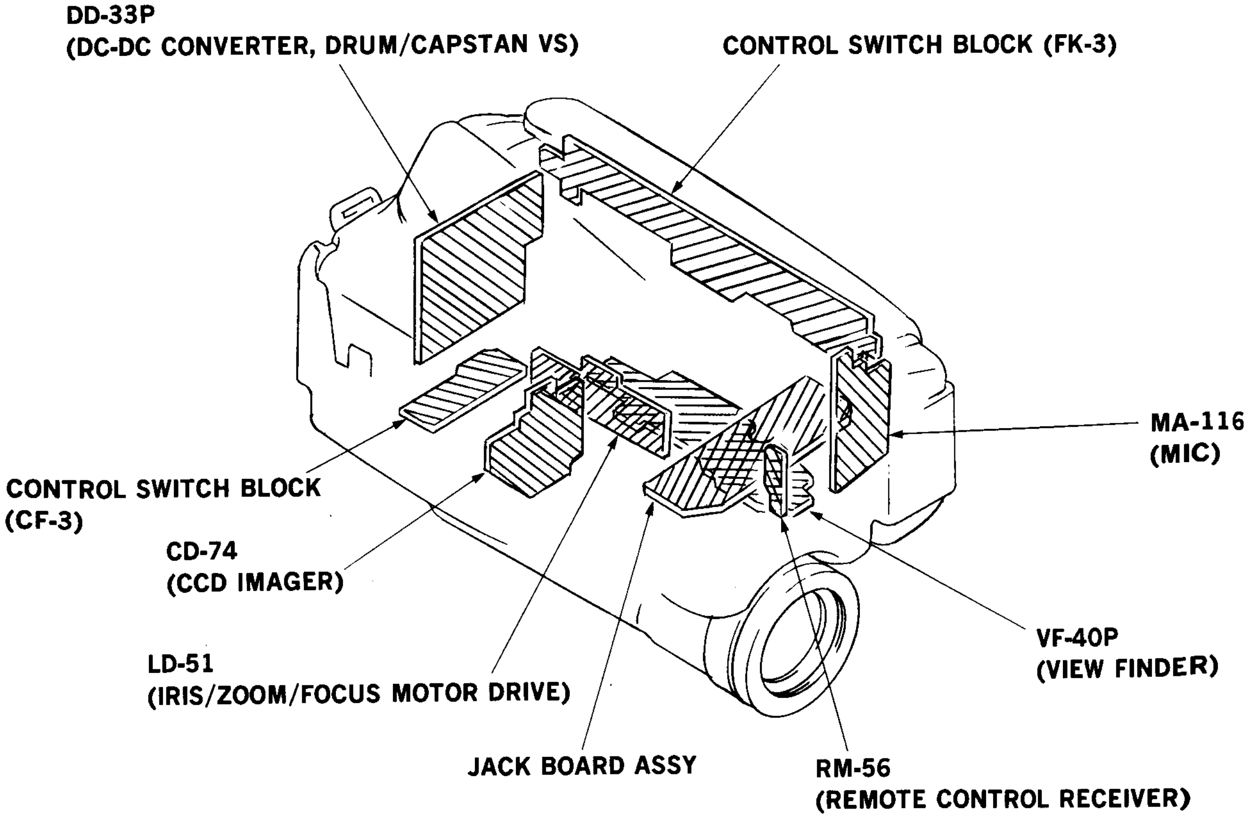

M903
DC motor (loading)
1-541-607-21
M902
DC motor (capstan)
8-835-329-12
Pinch roller
Jack board assy
1-537-373-11
S reel table assy
X-3727-952-1
T reel table assy
X-3727-951-2


AF motor assy
3-708-299-01
PZ motor assy
3-708-297-01
Zoom lens
(VCL-7808XA)
1-547-494-11

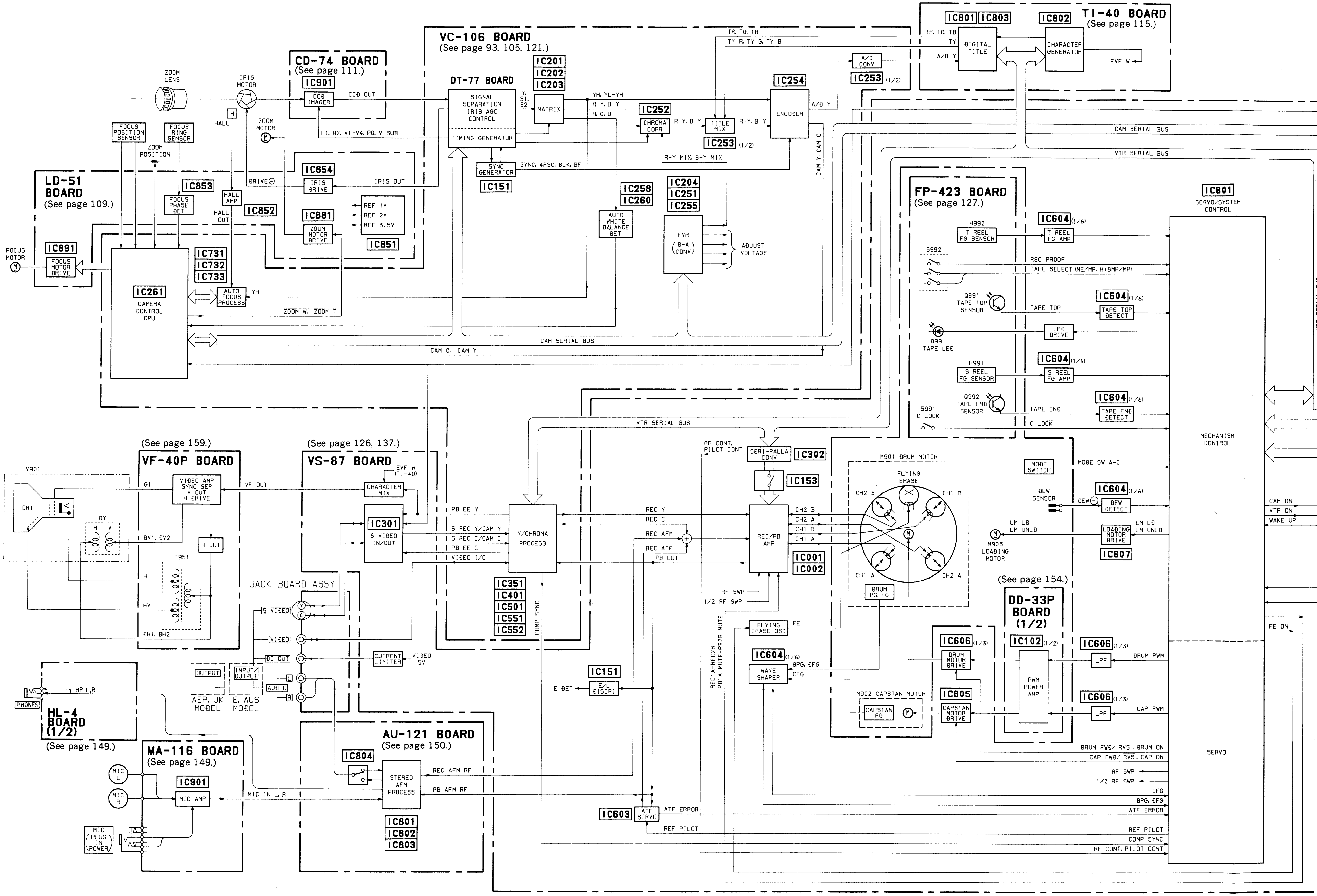
SECTION 3
DIAGRAMS

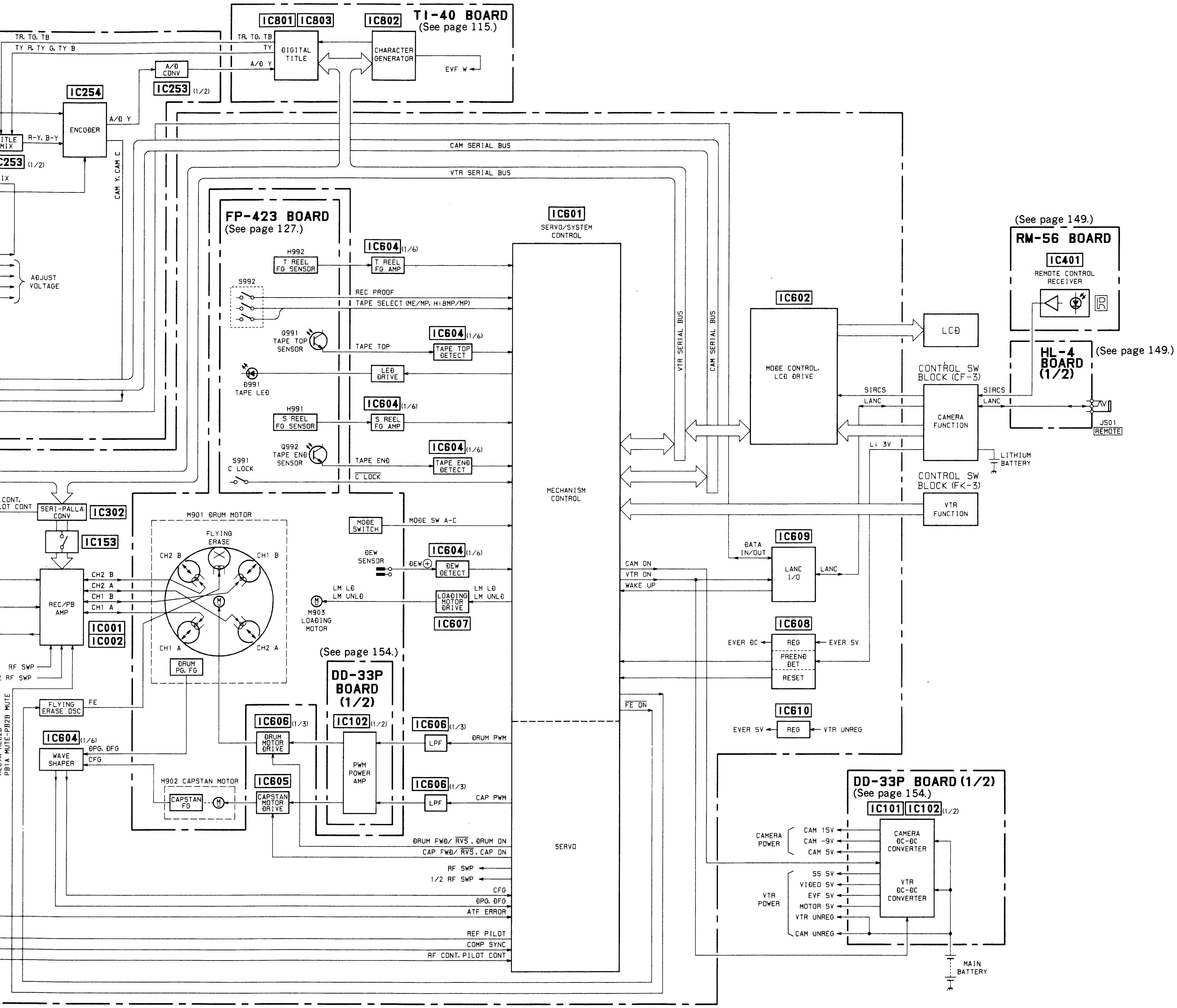
3-1. CIRCUIT BOARDS LOCATION


VS-87
(HEAD AMP, SERVO, SYSTEM CONTROL, RF, IN/OUT)
DT-77 (HIC101)
(TIMING GENERATOR, CCD DRIVE)
VC-106
(CAMERA, VIDEO)
AU-121
(AFM STEREO)
HL-4
(HP/LANC JACK)
TI-40
(TITLER)

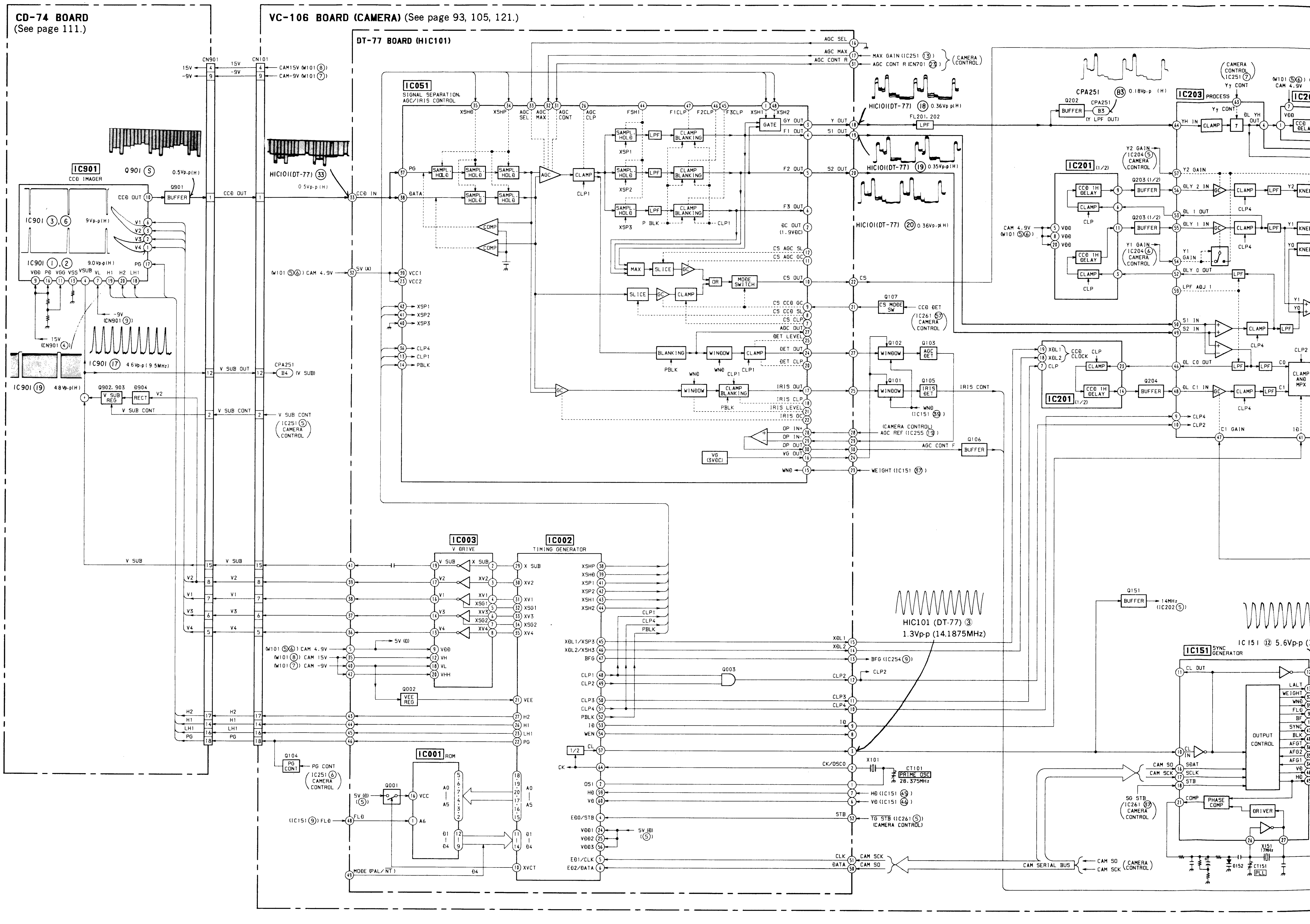

DD-33P
(DC-DC CONVERTER, DRUM/CAPSTAN VS)
CONTROL SWITCH BLOCK (FK-3)
MA-116
(MIC)
CONTROL SWITCH BLOCK
(CF-3)
CD-74
(CCD IMAGER)
VF-40P
(VIEW FINDER)
LD-51
(IRIS/ZOOM/FOCUS MOTOR DRIVE)
JACK BOARD ASSY
RM-56
(REMOTE CONTROL RECEIVER)

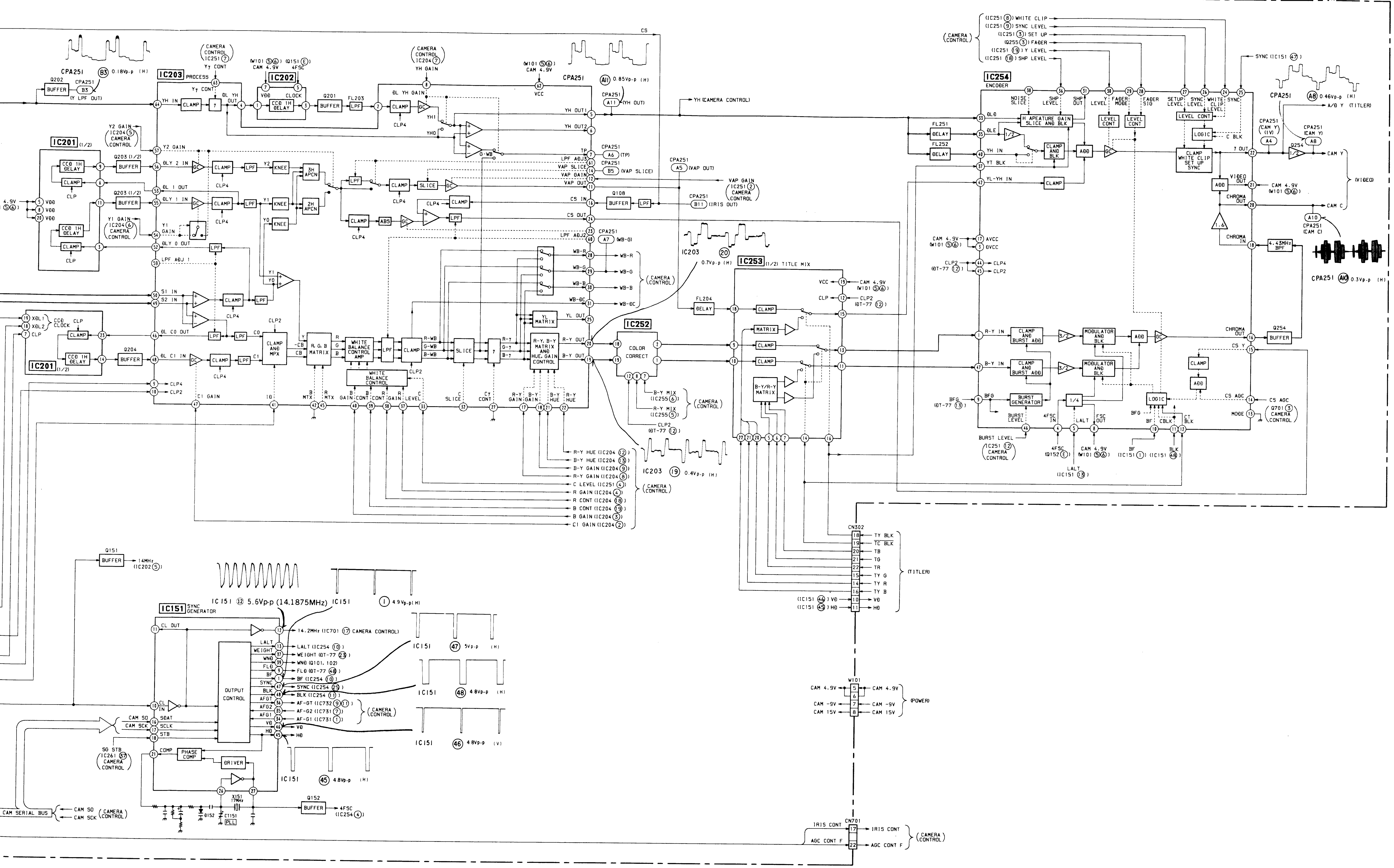
3-2. OVERALL BLOCK DIAGRAM


ZOOM LENS
IRIS MOTOR
CD-74 BOARD
(See page 111.)
IC901
CCD IMAGER
CCD OUT
H1, H2, V1-V4, PG, V SUB
HALL
ZOOM MOTOR
FOCUS POSITION SENSOR
FOCUS RING SENSOR
ZOOM POSITION
LD-51 BOARD
(See page 109.)
IC853
FOCUS PHASE DET
HALL AMP
HALL OUT
IC852
IC854
IRIS DRIVE
DRIVE⊕
IRIS OUT
IC881
ZOOM MOTOR DRIVE
REF 1V
REF 2V
REF 3.5V
IC851
FOCUS MOTOR
IC891
FOCUS MOTOR DRIVE
IC261
CAMERA CONTROL CPU
IC731
IC732
IC733
AUTO FOCUS PROCESS
YH
ZOOM W, ZOOM T
CAM SERIAL BUS
CAM C, CAM Y
VC-106 BOARD
(See page 93, 105, 121.)
DT-77 BOARD
IC201
IC202
IC203
SIGNAL SEPARATION IRIS AGC CONTROL
TIMING GENERATOR
Y, S1, S2
MATRIX
SYNC GENERATOR
SYNC, 4FSC, BLK, BF
IC151
YH, YL-YH
R-Y, B-Y
R, G, B
IC252
CHROMA CORR
R-Y, B-Y
TITLE MIX
IC253 (1/2)
R-Y MIX, B-Y MIX
IC254
ENCODER
A/D Y
CAM Y, CAM C
A/D CONV
IC253 (1/2)
TR, TG, TB
TY R, TY G, TY B
IC258
IC260
AUTO WHITE BALANCE DET
IC204
IC251
IC255
EVR (D-A CONV)
ADJUST VOLTAGE
TI-40 BOARD
(See page 115.)
IC801
IC803
IC802
DIGITAL TITLE
TY
A/D Y
CHARACTER GENERATOR
EVF W
CAM SERIAL BUS
VTR SERIAL BUS
FP-423 BOARD
(See page 127.)
H992
T REEL FG SENSOR
IC604 (1/6)
T REEL FG AMP
S992
REC PROOF
TAPE SELECT (ME/MP, Hi8MP/MP)
Q991
TAPE TOP SENSOR
TAPE TOP
IC604 (1/6)
TAPE TOP DETECT
D991
TAPE LED
LED DRIVE
H991
S REEL FG SENSOR
IC604 (1/6)
S REEL FG AMP
Q992
TAPE END SENSOR
TAPE END
IC604 (1/6)
TAPE END DETECT
S991
C LOCK
C LOCK
IC601
SERVO/SYSTEM CONTROL
MECHANISM CONTROL
SERVO
MODE SWITCH
MODE SW A-C
DEW SENSOR
DEW⊕
IC604 (1/6)
DEW DETECT
M903
LOADING MOTOR
LM LD
LM UNLD
LOADING MOTOR DRIVE
IC607
CAM ON
VTR ON
WAKE UP
FE ON
(See page 159.)
VF-40P BOARD
V901
CRT
DY
G1
VIDEO AMP SYNC SEP V OUT H DRIVE
VF OUT
DV1, DV2
H OUT
T951
H
HV
DH1, DH2
(See page 126, 137.)
VS-87 BOARD
EVF W (TI-40)
CHARACTER MIX
IC301
S VIDEO IN/OUT
PB EE Y
S REC Y/CAM Y
S REC C/CAM C
PB EE C
VIDEO I/O
Y/CHROMA PROCESS
IC351
IC401
IC501
IC551
IC552
COMP SYNC
JACK BOARD ASSY
S VIDEO
VIDEO
DC OUT
AUDIO
L
R
OUTPUT
INPUT/OUTPUT
AEP, UK MODEL
E, AUS MODEL
CURRENT LIMITER
VIDEO 5V
VTR SERIAL BUS
RF CONT, PILOT CONT
SERI-PALLA CONV
IC302
IC153
REC Y
REC C
REC AFM
REC ATF
PB OUT
REC/PB AMP
IC001
IC002
RF SWP
1/2 RF SWP
M901 DRUM MOTOR
FLYING ERASE
CH2 B
CH1 B
CH1 A
CH2 A
CH2 B
CH2 A
CH1 B
CH1 A
DRUM PG, FG
FE
FLYING ERASE OSC
REC1A-REC2B PB1A MUTE-PB2B MUTE
IC604 (1/6)
WAVE SHAPER
DPG, DFG
CFG
IC151
E DET
E/L DISCRI
M902 CAPSTAN MOTOR
CAPSTAN FG
(See page 154.)
DD-33P BOARD (1/2)
IC606 (1/3)
DRUM MOTOR DRIVE
IC102 (1/2)
PWM POWER AMP
IC605
CAPSTAN MOTOR DRIVE
IC606 (1/3)
LPF
DRUM PWM
IC606 (1/3)
LPF
CAP PWM
DRUM FWD/RVS, DRUM ON
CAP FWD/RVS, CAP ON
RF SWP
1/2 RF SWP
CFG
DPG, DFG
ATF ERROR
REF PILOT
COMP SYNC
RF CONT, PILOT CONT
PHONES
HP L, R
HL-4 BOARD (1/2)
(See page 149.)
MA-116 BOARD
(See page 149.)
MIC L
MIC R
IC901
MIC AMP
MIC (PLUG IN POWER)
MIC IN L, R
AU-121 BOARD
(See page 150.)
IC804
STEREO AFM PROCESS
REC AFM RF
PB AFM RF
IC801
IC802
IC803
IC603
ATF SERVO
ATF ERROR
REF PILOT

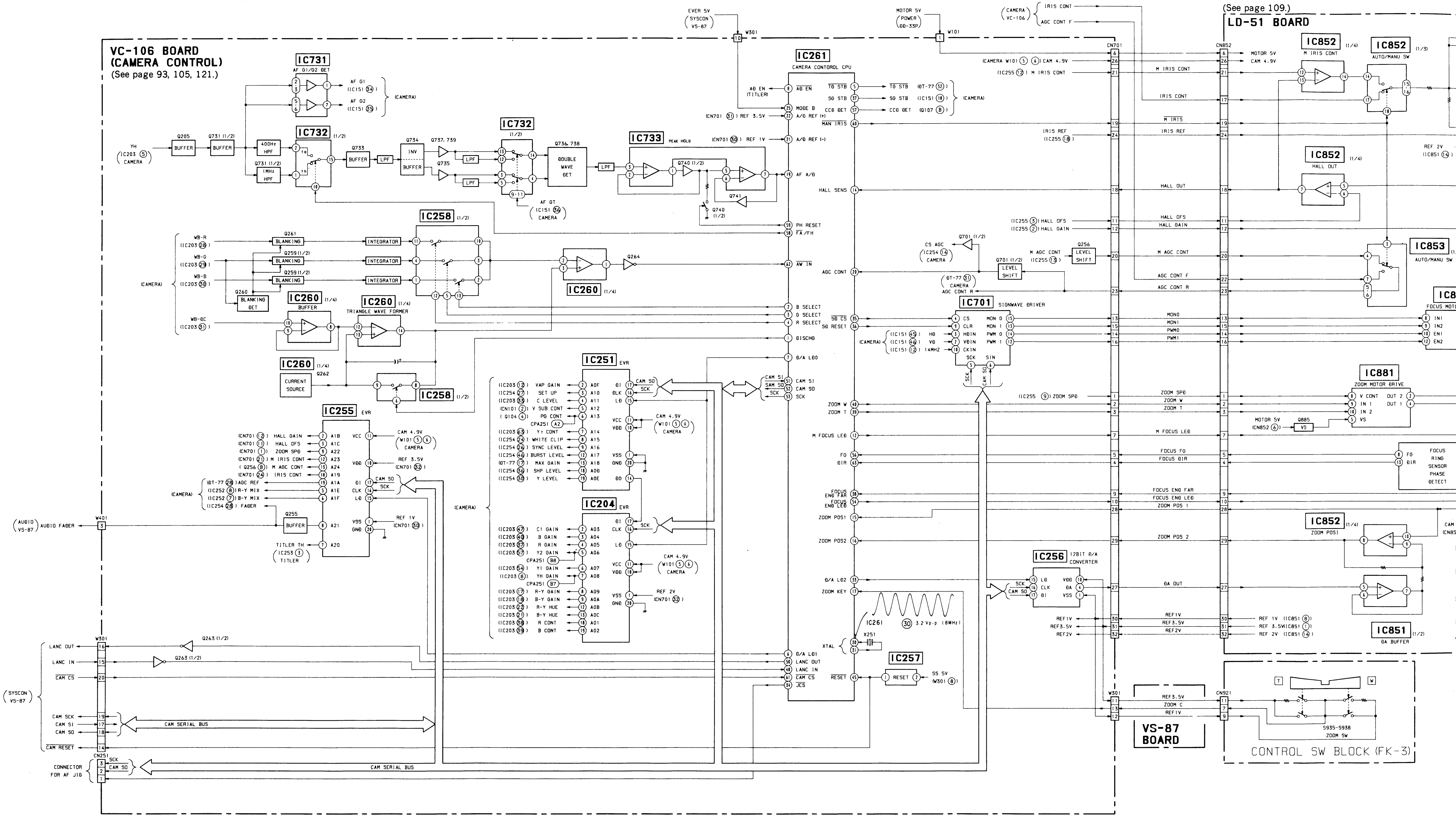

TI-40 BOARD
(See page 115.)
IC801
IC803
IC802
TR, TG, TB
TY
A/D Y
DIGITAL TITLE
CHARACTER GENERATOR
EVF W
TR, TG, TB
TY R, TY G, TY B
A/D CONV
IC253 (1/2)
IC254
ENCODER
A/D Y
TITLE MIX
R-Y, B-Y
IC253 (1/2)
MIX
CAM Y, CAM C
CAM SERIAL BUS
VTR SERIAL BUS
ADJUST VOLTAGE
FP-423 BOARD
(See page 127.)
H992
T REEL FG SENSOR
IC604 (1/6)
T REEL FG AMP
S992
REC PROOF
TAPE SELECT (ME/MP, Hi8MP/MP)
Q991
TAPE TOP SENSOR
TAPE TOP
IC604 (1/6)
TAPE TOP DETECT
D991
TAPE LED
LED DRIVE
H991
S REEL FG SENSOR
IC604 (1/6)
S REEL FG AMP
Q992
TAPE END SENSOR
TAPE END
IC604 (1/6)
TAPE END DETECT
S991
C LOCK
C LOCK
IC601
SERVO/SYSTEM CONTROL
MECHANISM CONTROL
SERVO
VTR SERIAL BUS
CAM SERIAL BUS
IC602
MODE CONTROL, LCD DRIVE
LCD
CONTROL SW BLOCK (CF-3)
CAMERA FUNCTION
SIRCS
LANC
Li 3V
LITHIUM BATTERY
CONTROL SW BLOCK (FK-3)
VTR FUNCTION
(See page 149.)
RM-56 BOARD
IC401
REMOTE CONTROL RECEIVER
HL-4 BOARD (1/2)
(See page 149.)
SIRCS
LANC
J501
REMOTE
CONT.
PILOT CONT
SERI-PALLA CONV
IC302
IC153
REC/PB AMP
CH2 B
CH2 A
CH1 B
CH1 A
IC001
IC002
RF SWP
1/2 RF SWP
PB1A MUTE-PB2B MUTE
M901 DRUM MOTOR
FLYING ERASE
CH2 B
CH1 B
CH1 A
CH2 A
DRUM PG, FG
MODE SWITCH
MODE SW A-C
DEW SENSOR
DEW
IC604 (1/6)
DEW DETECT
M903 LOADING MOTOR
LM LD
LM UNLD
LOADING MOTOR DRIVE
LM LD
LM UNLD
IC607
FLYING ERASE OSC
FE
IC604 (1/6)
WAVE SHAPER
DPG, DFG
CFG
M902 CAPSTAN MOTOR
CAPSTAN FG
IC606 (1/3)
DRUM MOTOR DRIVE
IC605
CAPSTAN MOTOR DRIVE
(See page 154.)
DD-33P BOARD (1/2)
IC102 (1/2)
PWM POWER AMP
IC606 (1/3)
LPF
DRUM PWM
IC606 (1/3)
LPF
CAP PWM
DRUM FWD/RVS, DRUM ON
CAP FWD/RVS, CAP ON
RF SWP
1/2 RF SWP
CFG
DPG, DFG
ATF ERROR
REF PILOT
COMP SYNC
RF CONT, PILOT CONT
CAM ON
VTR ON
WAKE UP
DATA IN/OUT
IC609
LANC I/O
LANC
IC608
EVER DC
REG
EVER 5V
PREEND DET
RESET
FE ON
IC610
EVER 5V
REG
VTR UNREG
DD-33P BOARD (1/2)
(See page 154.)
IC101
IC102 (1/2)
CAMERA POWER
CAM 15V
CAM -9V
CAM 5V
CAMERA DC-DC CONVERTER
VTR POWER
SS 5V
VIDEO 5V
EVF 5V
MOTOR 5V
VTR UNREG
CAM UNREG
VTR DC-DC CONVERTER
MAIN BATTERY

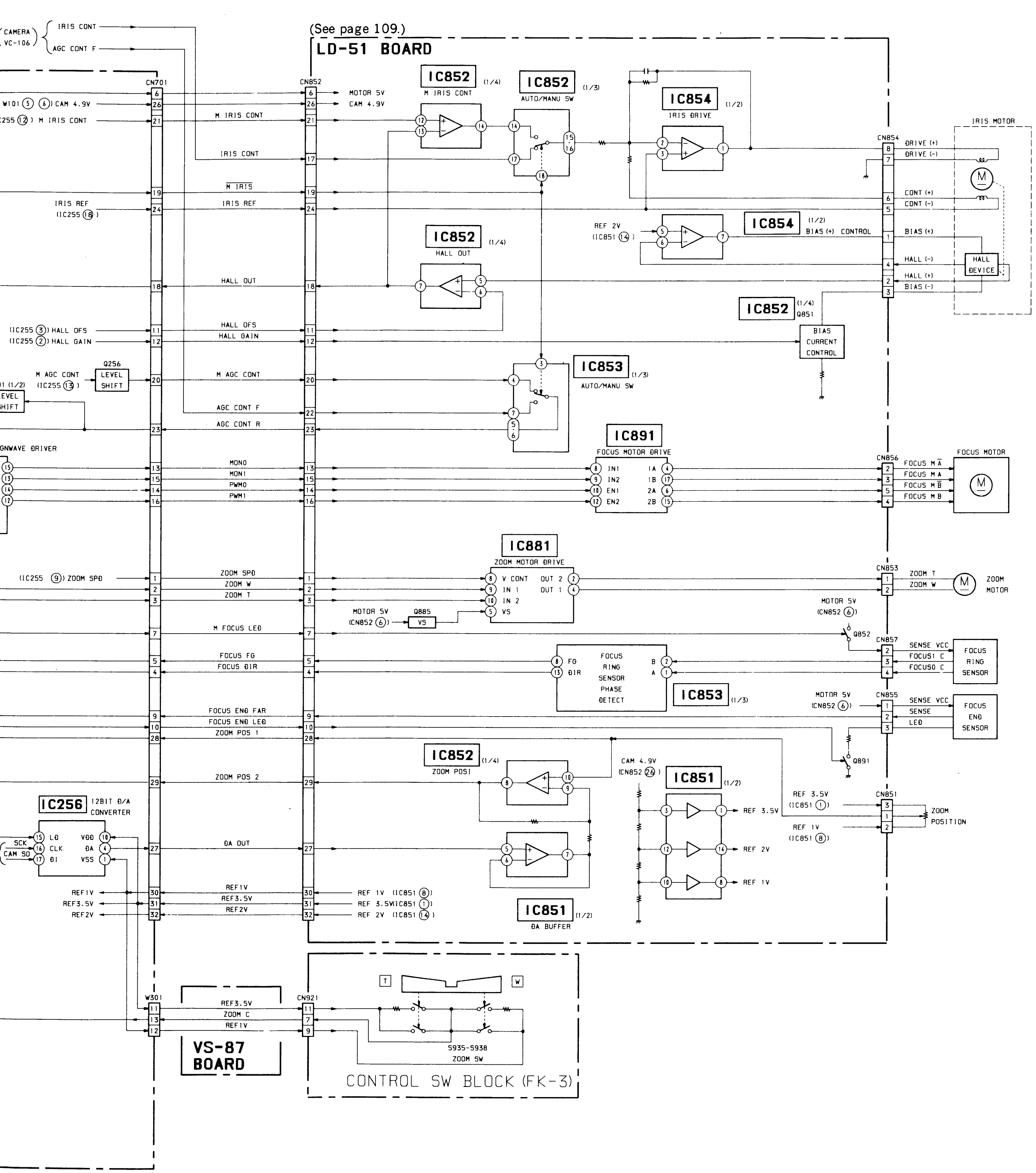
3-3. CAMERA BLOCK DIAGRAM


CD-74 BOARD
(See page 111.)
VC-106 BOARD (CAMERA) (See page 93, 105, 121.)
DT-77 BOARD (HIC101)
IC901
CCD IMAGER
Q901 (S)
Q901
BUFFER
CCD OUT
IC051
SIGNAL SEPARATION, AGC/IRIS CONTROL
SAMPL HOLD
AGC
CLAMP
LPF
CLAMP BLANKING
GATE
MAX
SLICE
OR
MODE SWITCH
BLANKING
WINDOW
VG (3VDC)
HIC101(DT-77) (33)
0.5Vp-p (H)
HIC101(DT-77) (18) 0.36Vp-p(H)
HIC101(DT-77) (19) 0.35Vp-p(H)
HIC101(DT-77) (20) 0.36Vp-p(H)
IC901 (17) 4.6Vp-p (9.5MHz)
IC901 (19) 48Vp-p(H)
IC901 (3),(6) 9Vp-p(H)
IC901 (1),(2) 9.0Vp-p(H)
Q902, 903
V SUB REG
Q904
RECT
CN901
CN101
V SUB OUT
V SUB CONT
CPA251 (B4) (V SUB)
IC003
V DRIVE
IC002
TIMING GENERATOR
IC001 ROM
Q001
Q002
VEE REG
Q003
Q104
PG CONT
X101
CT101
PRIME OSC
28.375MHz
HIC101 (DT-77) (3)
1.3Vp-p (14.1875MHz)
MODE (PAL/NT)
FL201, 202
LPF
Q202
BUFFER
CPA251 (B3) 0.18Vp-p (H)
(Y LPF OUT)
IC203 PROCESS
IC201 (1/2)
CCD 1H DELAY
Q203 (1/2)
Q204
Q107
CS MODE SW
Q102
WINDOW
Q103
AGC DET
Q101
Q105
IRIS DET
Q106
BUFFER
IRIS CONT
Q151
BUFFER
14MHz (IC202 (5))
IC151 SYNC GENERATOR
IC151 (12) 5.6Vp-p
OUTPUT CONTROL
PHASE COMP
DRIVER
X151
CT151
PLL
CAM SERIAL BUS
CAM SO
CAM SCK
(CAMERA CONTROL)


IC203 PROCESS
IC202
IC201 (1/2)
IC201 (1/2)
IC252
IC253 (1/2) TITLE MIX
IC254 ENCODER
IC151 SYNC GENERATOR
CPA251 B3 0.18Vp-p (H)
CPA251 A11 0.85Vp-p (H)
CPA251 A8 0.46Vp-p (H)
CPA251 A10 0.3Vp-p (H)
IC203 20 0.7Vp-p (H)
IC203 19 0.4Vp-p (H)
IC151 12 5.6Vp-p (14.1875MHz)
IC151 1 4.9Vp-p (H)
IC151 47 5Vp-p (H)
IC151 48 4.8Vp-p (H)
IC151 46 4.8Vp-p (V)
IC151 45 4.8Vp-p (H)
CCD 1H DELAY
BUFFER
CLAMP
LPF
KNEE
3H APCN
2H APCN
SLICE
GC
ABS
R.G.B MATRIX
WHITE BALANCE CONTROL AMP
WHITE BALANCE CONTROL
CLAMP AND MPX
YL MATRIX
R-Y, B-Y MATRIX AND HUE, GAIN CONTROL
COLOR CORRECT
DELAY
MATRIX
B-Y/R-Y MATRIX
H APEATURE GAIN SLICE AND BLK
CLAMP AND BLK
ADD
LEVEL CONT
CLAMP WHITE CLIP SET UP SYNC
LOGIC
CLAMP AND BURST ADD
MODULATOR AND BLK
BURST GENERATOR
4.43MHz BPF
OUTPUT CONTROL
PHASE COMP
DRIVER
YH (CAMERA CONTROL)
VAP GAIN (IC251 2 CAMERA CONTROL)
A/D Y (TITLER)
CAM Y
CAM C
(VIDEO)
(CAMERA CONTROL)
CN302
TY BLK
TC BLK
TB
TG
TR
TY G
TY R
TY B
VD
HD
(TITLER)
W101
CAM 4.9V
CAM -9V
CAM 15V
(POWER)
CN701
IRIS CONT
AGC CONT F
CAM SERIAL BUS
CAM SO
CAM SCK
14MHz (IC202 5)
4FSC (IC254 4)
14.2MHz (IC701 17 CAMERA CONTROL)
LALT (IC254 10)
WEIGHT (DT-77 23)
WND (Q101, 102)
FLD (DT-77 48)
BF (IC254 10)
SYNC (IC254 25)
BLK (IC254 11)
AF-DT (IC732 9 11)
AF-G2 (IC731 7)
AF-G1 (IC731 1)
R-Y HUE (IC204 12)
B-Y HUE (IC204 13)
B-Y GAIN (IC204 9)
R-Y GAIN (IC204 8)
C LEVEL (IC251 4)
R GAIN (IC204 4)
R CONT (IC204 18)
B CONT (IC204 19)
B GAIN (IC204 3)
C1 GAIN (IC204 2)
(IC251 8) WHITE CLIP
(IC251 9) SYNC LEVEL
(IC251 3) SET UP
(Q255 3) FADER
(IC251 19) Y LEVEL
(IC251 18) SHP LEVEL
SYNC (IC151 47)

3-4. CAMERA CONTROL BLOCK DIAGRAM


VC-106 BOARD
(CAMERA CONTROL)
(See page 93, 105, 121.)
LD-51 BOARD
(See page 109.)
VS-87 BOARD
CONTROL SW BLOCK (FK-3)
IC731 AF G1/G2 DET
IC732
IC733 PEAK HOLD
IC261 CAMERA CONTOROL CPU
IC258
IC260 BUFFER
IC260 TRIANGLE WAVE FORMER
IC260 CURRENT SOURCE
IC251 EVR
IC204 EVR
IC255 EVR
IC701 SIGNWAVE DRIVER
IC256 12BIT D/A CONVERTER
IC257 RESET
IC852 M IRIS CONT
IC852 AUTO/MANU SW
IC852 HALL OUT
IC853 AUTO/MANU SW
IC881 ZOOM MOTOR DRIVE
IC852 ZOOM POSI
IC851 DA BUFFER
DOUBLE WAVE DET
BUFFER
INV
LPF
400Hz HPF
1MHz HPF
BLANKING
BLANKING DET
INTEGRATOR
LEVEL SHIFT
CAM SERIAL BUS
CONNECTOR FOR AF JIG
LANC OUT
LANC IN
CAM CS
CAM SCK
CAM SI
CAM SO
CAM RESET
AUDIO FADER
X251
3.2 Vp-p (8MHz)
S935-S938 ZOOM SW
FG RING SENSOR PHASE DETECT
W301
W101
W401
CN701
CN852
CN921
CN251

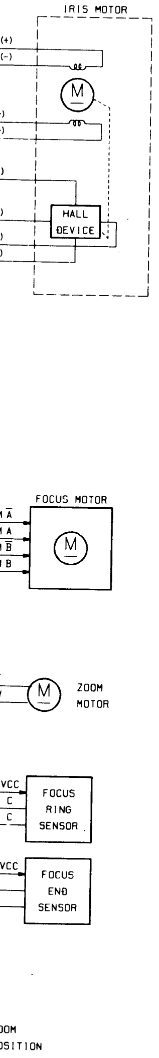


(See page 109.)
LD-51 BOARD
CAMERA VC-106
IRIS CONT
AGC CONT F
CN701
CN852
IC852
IC854
IRIS DRIVE
AUTO/MANU SW
IRIS MOTOR
CN854
DRIVE (+)
DRIVE (−)
CONT (+)
CONT (−)
BIAS (+)
HALL (−)
HALL (+)
BIAS (−)
HALL DEVICE
BIAS (+) CONTROL
BIAS CURRENT CONTROL
HALL OUT
HALL OFS
HALL GAIN
M AGC CONT
Q256 LEVEL SHIFT
IC853
IC891
FOCUS MOTOR DRIVE
FOCUS MOTOR
CN856
IC881
ZOOM MOTOR DRIVE
ZOOM MOTOR
CN853
ZOOM SPD
ZOOM W
ZOOM T
M FOCUS LED
FOCUS FG
FOCUS DIR
FOCUS RING SENSOR PHASE DETECT
FOCUS RING SENSOR
CN857
FOCUS END FAR
FOCUS END LED
FOCUS END SENSOR
CN855
ZOOM POS 1
ZOOM POS 2
ZOOM POSI
IC851
REF 3.5V
REF 2V
REF 1V
ZOOM POSITION
CN851
IC256
12BIT D/A CONVERTER
DA OUT
DA BUFFER
W301
CN921
VS-87 BOARD
REF3.5V
ZOOM C
REF1V
S935-S938 ZOOM SW
CONTROL SW BLOCK (FK-3)

3-5. CAMERA SYSTEM CONTROL TERMINAL DESCRIPTION VC-106 BOARD IC261 (MC68HC11L6FU)

Pin No.	Signal Name	I/O	Function
1	DISCHG	O	AWB, AE integrating A/D reset pulse, V period "H" pulse
2	B SELECT	O	AWB measuring line select pulse (blue)
3	G SELECT	O	AWB measuring line select pulse (green)
4	R SELECT	O	AWB measuring line select pulse (red)
5	$\overline{\text{TG STB}}$	O	Strobe signal to timing generator Camera mode ... V period "High" pulse. In VTR mode, this output becomes "Low".
6	D/A LD 1	O	Data load command to EVR (IC255), V period "High" pulse
7	D/A LD 0	O	Data load command to EVR (IC204,205), V period "High" pulse
8	$\overline{\text{AD EN}}$	O	Titler 1-bit A/D converter operation ON/OFF output. Normally "High". When MODE button is pushed, this becomes 7V period "Low" pulse.
9	N.C		
10	N.C		
11	N.C		
12	M FOCUS LED	O	Manual focus sensor ON/OFF control. In manual focus mode, this output becomes "Low".
13	N.C		
14	HALL SENS	I	Hall element voltage input (analog input)
15	ZOOM POS 1	I	Zoom position detection voltage input (analog input)
16	ZOOM POS 2	I	Zoom position detection voltage input (analog input)
17	ZOOM KEY	I	Zoom switch voltage input (analog input)
18	N.C		
19	AF A/D	I	AF evaluation value detection input (analog input).
20	AGC CONT	I	AGC voltage input (analog input)
21	A/D REF (−)	—	Built-in A/D converter lower limit reference voltage (analog input)
22	A/D REF (+)	—	Built-in A/D converter upper limit reference voltage (analog input)
23	A VDD	—	SS 5V
24	VSS	—	GND
25	MODE B	—	Pull-up to EVER 5V
26	N.C		
27	N.C		
28	N.C		
29	N.C		
30	EXTAL	I	Clock oscillation
31	XTAL	O	
32	VDD	—	SS 5V
33	D/A LD 2	O	Data load command to 12-bit D/A converter (IC256), V period "High" pulse
34	$\overline{\text{JCS}}$	O	Used for external indicator jig data latch, V period "High" pulse
35	$\overline{\text{SD CS}}$	O	Sine wave driver chip select signal
36	$\overline{\text{SD RESET}}$	O	Sine wave driver reset signal
37	SG STB	O	Sync generator data latch pulse
38	FOC END FAR	I	Focus lens initial position read
39	ZOOM T	O	Zoom motor telephotographic direction rotation designation
40	ZOOM W	O	Zoom motor wide angle direction rotation designation
41	N.C		
42	N.C		
43	N.C		
44	N.C		

Pin N
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64

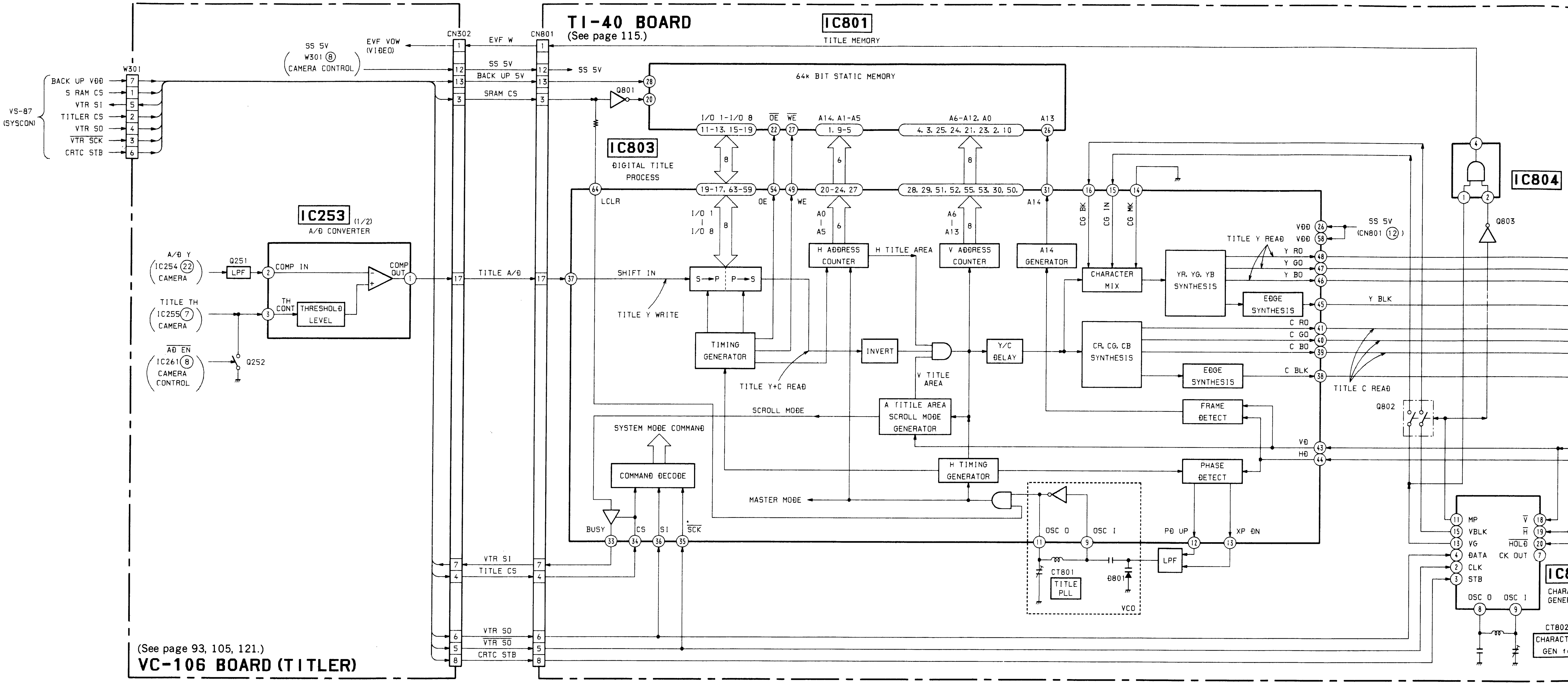


3-5. CAMERA SYSTEM CONTROL TERMINAL DESCRIPTION VC-106 BOARD IC261 (MC68HC11L6FU)

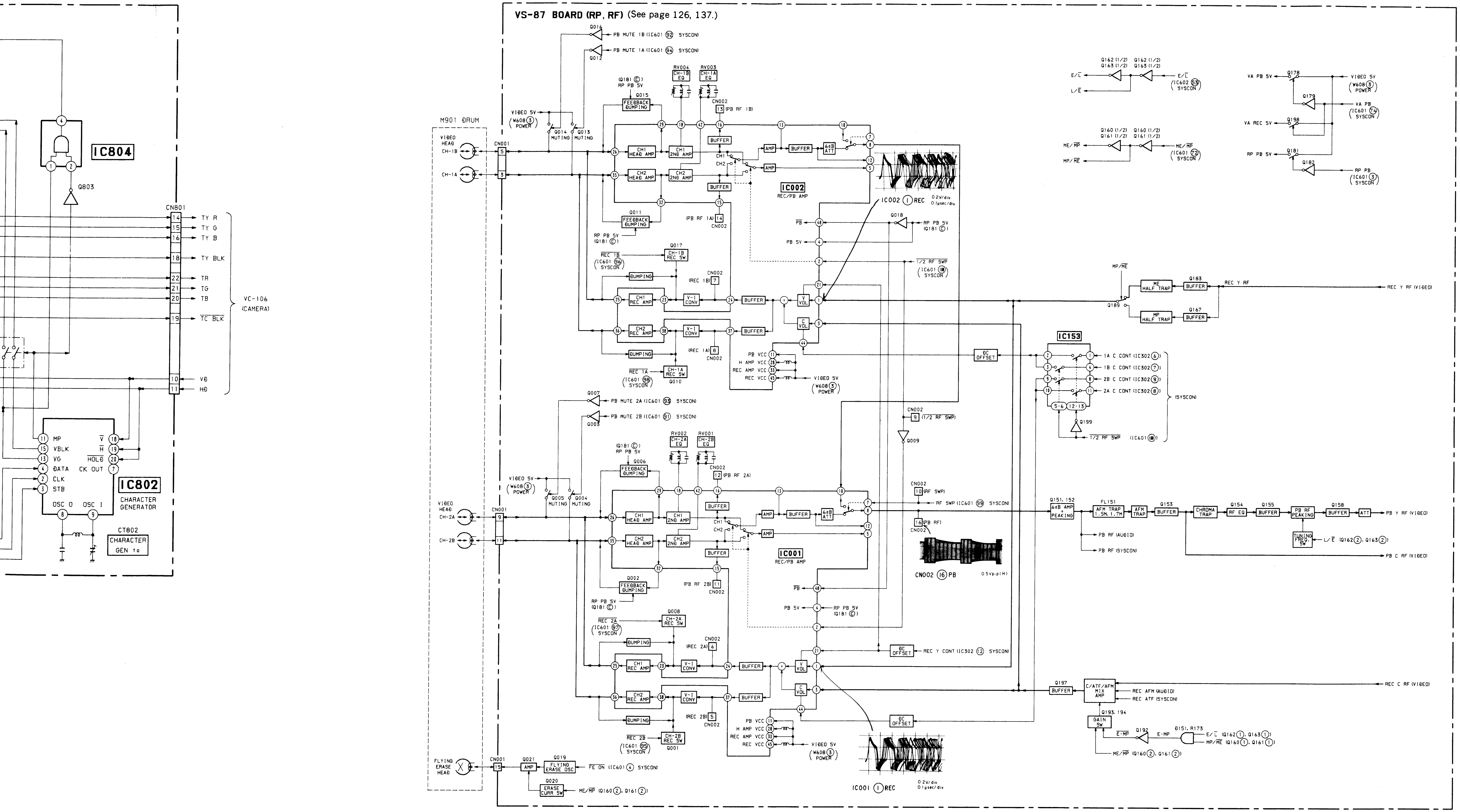
Pin No.	Signal Name	I/O	Function
1	DISCHG	O	AWB, AE integrating A/D reset pulse, V period "H" pulse
2	B SELECT	O	AWB measuring line select pulse (blue)
3	G SELECT	O	AWB measuring line select pulse (green)
4	R SELECT	O	AWB measuring line select pulse (red)
5	$\overline{\text{TG STB}}$	O	Strobe signal to timing generator Camera mode ... V period "High" pulse. In VTR mode, this output becomes "Low".
6	D/A LD 1	O	Data load command to EVR (IC255), V period "High" pulse
7	D/A LD 0	O	Data load command to EVR (IC204,205), V period "High" pulse
8	$\overline{\text{AD EN}}$	O	Titler 1-bit A/D converter operation ON/OFF output. Normally "High". When MODE button is pushed, this becomes 7V period "Low" pulse.
9	N.C		
10	N.C		
11	N.C		
12	M FOCUS LED	O	Manual focus sensor ON/OFF control. In manual focus mode, this output becomes "Low".
13	N.C		
14	HALL SENS	I	Hall element voltage input (analog input)
15	ZOOM POS 1	I	Zoom position detection voltage input (analog input)
16	ZOOM POS 2	I	Zoom position detection voltage input (analog input)
17	ZOOM KEY	I	Zoom switch voltage input (analog input)
18	N.C		
19	AF A/D	I	AF evaluation value detection input (analog input).
20	AGC CONT	I	AGC voltage input (analog input)
21	A/D REF (−)	—	Built-in A/D converter lower limit reference voltage (analog input)
22	A/D REF (+)	—	Built-in A/D converter upper limit reference voltage (analog input)
23	A VDD	—	SS 5V
24	VSS	—	GND
25	MODE B	—	Pull-up to EVER 5V
26	N.C		
27	N.C		
28	N.C		
29	N.C		
30	EXTAL	I	Clock oscillation
31	XTAL	O	
32	VDD	—	SS 5V
33	D/A LD 2	O	Data load command to 12-bit D/A converter (IC256), V period "High" pulse
34	$\overline{\text{JCS}}$	O	Used for external indicator jig data latch, V period "High" pulse
35	$\overline{\text{SD CS}}$	O	Sine wave driver chip select signal
36	SD RESET	O	Sine wave driver reset signal
37	SG STB	O	Sync generator data latch pulse
38	FOC END FAR	I	Focus lens initial position read
39	ZOOM T	O	Zoom motor telephotographic direction rotation designation
40	ZOOM W	O	Zoom motor wide angle direction rotation designation
41	N.C		
42	N.C		
43	N.C		
44	N.C		

Pin No.	Signal Name	I/O	Function
45	$\overline{\text{RESET}}$	—	Reset.
46	$\overline{\text{XIRQ}}$	I	Pull-up to SS 5V
47	$\overline{\text{IRQ}}$	I	Pull-up to SS 5V
48	LANC IN	I	LANC input
49	VSS	—	GND
50	LANC OUT	O	LANC output
51	CAM SI	I	Serial data input from servo/system control
52	CAM SO	O	Serial data input to servo/system control and slave
53	SCK	O	Serial clock to servo/system control and slave
54	FOC END LED	O	Focus end LED drive
55	VDD	—	SS 5V
56	FG	I	Focus ring rotational speed input (PWM method)
57	CCD DET	O	CCD DET switch changeover
58	$\overline{\text{FA}}$/FH	O	AF detection frequency range changeover. FA : 400kHz∼ ; FH : 1MHz∼.
59	PH RESET	O	Peak hold IC (IC733) reset
60	$\overline{\text{MAN IRIS}}$	O	IRIS system AUTO/MANUAL changeover
61	$\overline{\text{CAM CS}}$	I	Chip select signal from servo/system control
62	$\overline{\text{AW IN}}$	I	Comparator input of integrating A/D converter for auto white balance
63	DIR	I	Focus ring rotation direction input
64	VSS	—	GND

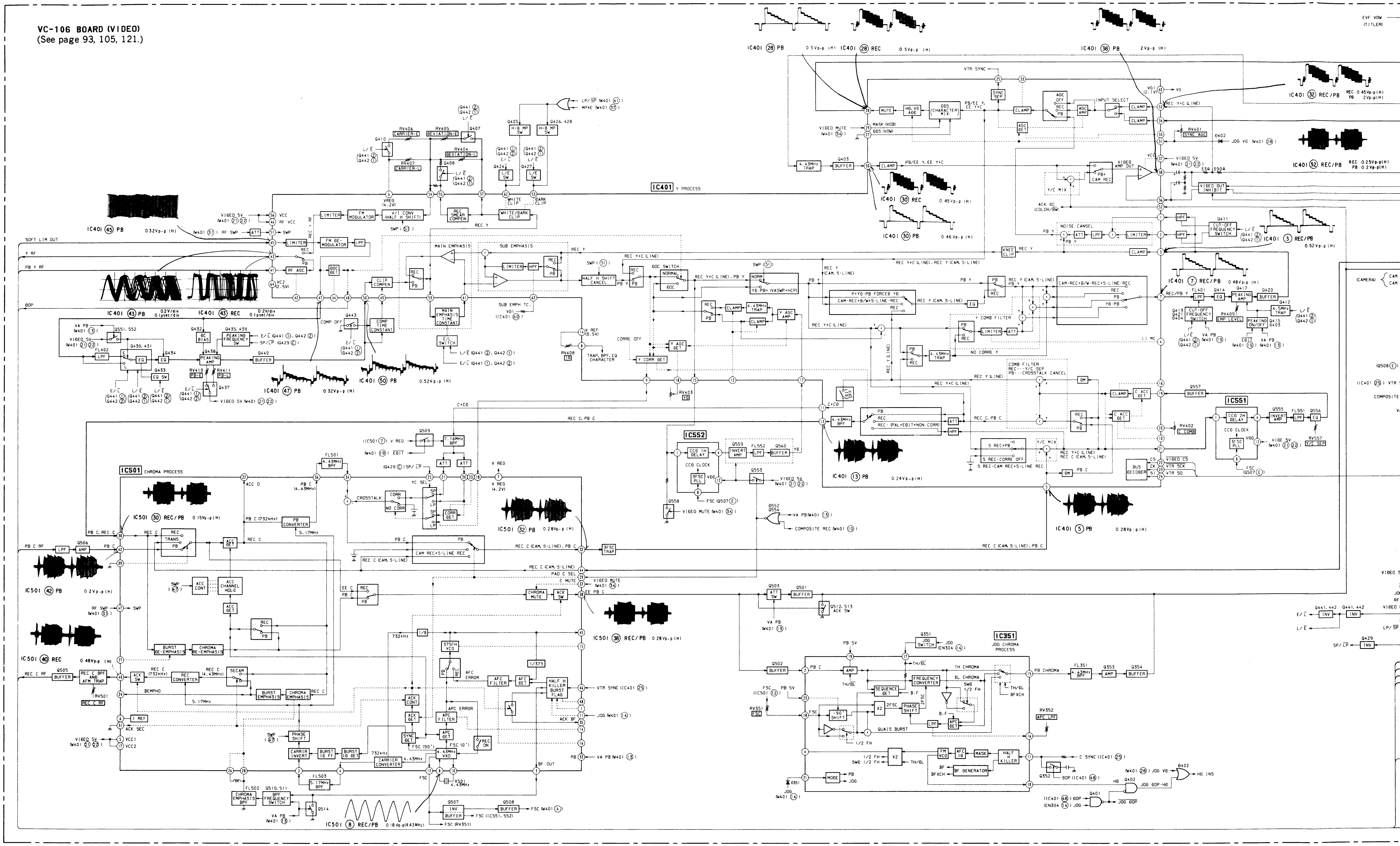
3-6. TITLER BLOCK DIAGRAM

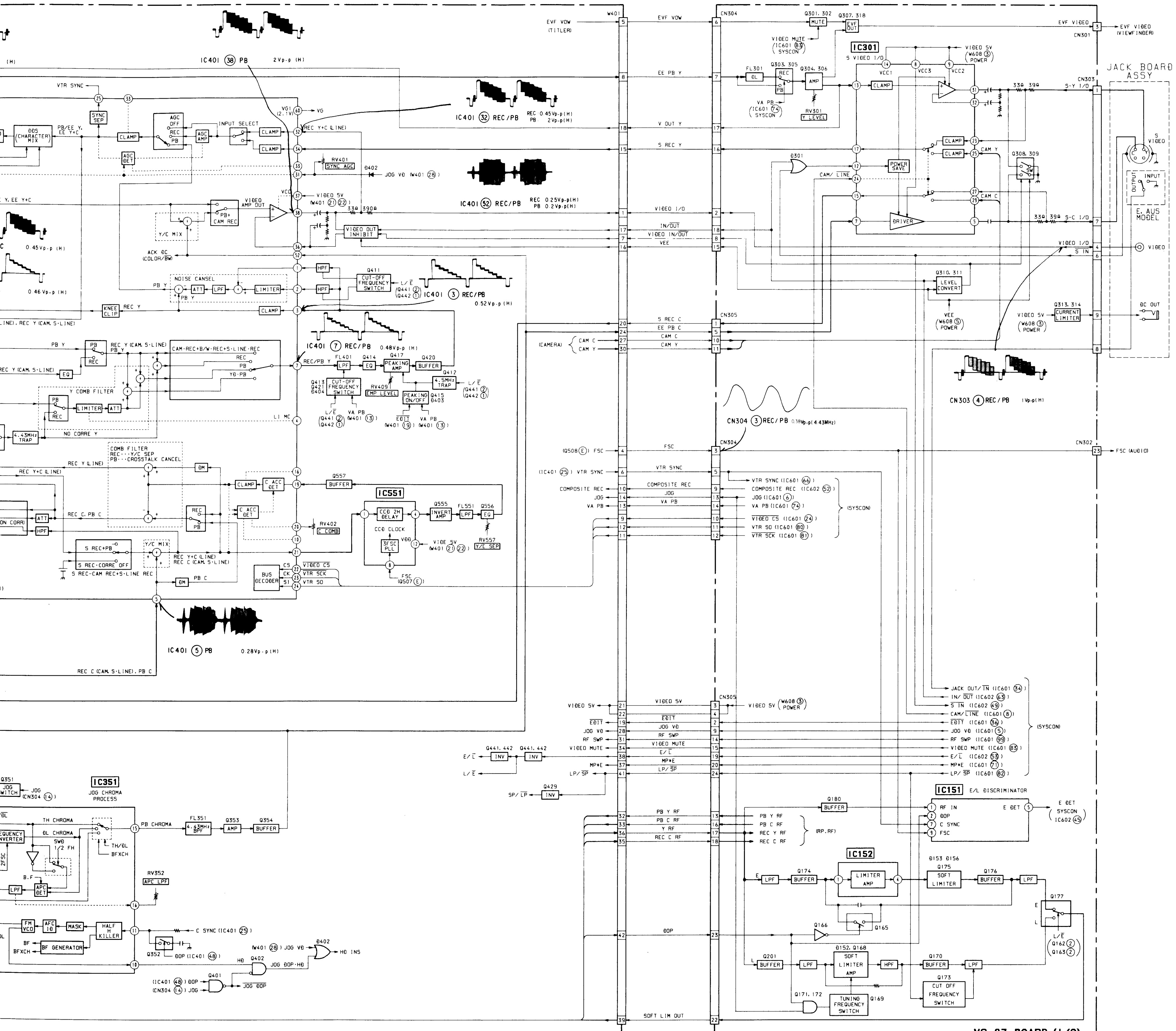

TI-40 BOARD
(See page 115.)
IC801
TITLE MEMORY
64k BIT STATIC MEMORY
I/O 1-I/O 8
OE
WE
A14, A1-A5
A6-A12, A0
A13
11-13, 15-19
1, 9-5
4, 3, 25, 24, 21, 23, 2, 10
IC803
DIGITAL TITLE PROCESS
19-17, 63-59
20-24, 27
28, 29, 51, 52, 55, 53, 30, 50,
LCLR
A14
I/O 1 | I/O 8
A0 | A5
A6 | A13
H ADDRESS COUNTER
H TITLE AREA
V ADDRESS COUNTER
A14 GENERATOR
CG BK
CG IN
CG MK
CHARACTER MIX
YR, YG, YB SYNTHESIS
EDGE SYNTHESIS
CR, CG, CB SYNTHESIS
EDGE SYNTHESIS
FRAME DETECT
PHASE DETECT
SHIFT IN
S→P P→S
TITLE Y WRITE
TIMING GENERATOR
INVERT
Y/C DELAY
TITLE Y+C READ
V TITLE AREA
A TITLE AREA SCROLL MODE GENERATOR
SCROLL MODE
SYSTEM MODE COMMAND
COMMAND DECODE
H TIMING GENERATOR
MASTER MODE
BUSY
CS
SI
SCK
OSC O
OSC I
CT801
TITLE PLL
D801
VCO
LPF
PD UP
XP DN
TITLE Y READ
VDD
SS 5V (CN801 ⑫)
Y RO
Y GO
Y BO
Y BLK
C RO
C GO
C BO
C BLK
TITLE C READ
Q802
VD
HD
Q803
IC804
MP
VBLK
VG
DATA
CLK
STB
V
H
HOLD
CK OUT
OSC O
OSC I
CT802
CHARACT GEN
CN302
CN801
EVF W
SS 5V
BACK UP 5V
SRAM CS
Q801
TITLE A/D
VTR SI
TITLE CS
VTR SO
VTR SO
CRTC STB
SS 5V
W301 ⑧
CAMERA CONTROL
EVF VDW (VIDEO)
W301
BACK UP VDD
S RAM CS
VTR SI
TITLER CS
VTR SO
VTR SCK
CRTC STB
VS-87 (SYSCON)
IC253 (1/2)
A/D CONVERTER
A/D Y
IC254 ㉒ CAMERA
Q251
LPF
COMP IN
COMP OUT
TITLE TH
IC255 ⑦ CAMERA
TH CONT
THRESHOLD LEVEL
AD EN
IC261 ⑧ CAMERA CONTROL
Q252
(See page 93, 105, 121.)
VC-106 BOARD (TITLER)

3-7. HEAD AMP, RF BLOCK DIAGRAM


VS-87 BOARD (RP, RF) (See page 126, 137.)
IC804
Q803
CN801
TY R
TY G
TY B
TY BLK
TR
TG
TB
TC BLK
VC-106
(CAMERA)
VD
HD
IC802
CHARACTER GENERATOR
MP
VBLK
VG
DATA
CLK
STB
CK OUT
HOLD
OSC 0
OSC 1
CT802
CHARACTER GEN fo
M901 DRUM
VIDEO HEAD CH-1B
CH-1A
VIDEO HEAD CH-2A
CH-2B
FLYING ERASE HEAD
CN001
Q016
Q012
PB MUTE 1B (IC601 92 SYSCON)
PB MUTE 1A (IC601 94 SYSCON)
RV004
RV003
CH-1B EQ
CH-1A EQ
Q015
FEEDBACK DUMPING
VIDEO 5V
(W608 ③ POWER)
Q014 MUTING
Q013 MUTING
CH1 HEAD AMP
CH2 HEAD AMP
CH1 2ND AMP
CH2 2ND AMP
BUFFER
AMP
6dB ATT
IC002
REC/PB AMP
IC002 ① REC
0.2V/div. 0.1µsec/div.
Q011
Q018
RP PB 5V
(Q181 Ⓒ)
PB
PB 5V
1/2 RF SWP
(IC601 ⑩ SYSCON)
Q017
CH-1B REC SW
REC 1B (IC601 96 SYSCON)
DUMPING
CH1 REC AMP
CH2 REC AMP
V-I CONV
V VOL
C VOL
CH-1A REC SW
REC 1A (IC601 98 SYSCON)
Q010
PB VCC
H AMP VCC
REC AMP VCC
REC VCC
DC OFFSET
IC153
1A C CONT (IC302 ⑥)
1B C CONT (IC302 ⑦)
2B C CONT (IC302 ⑨)
2A C CONT (IC302 ⑧)
(SYSCON)
Q199
Q007
Q003
PB MUTE 2A (IC601 93 SYSCON)
PB MUTE 2B (IC601 91 SYSCON)
RV002
RV001
CH-2A EQ
CH-2B EQ
Q006
Q005 MUTING
Q004 MUTING
IC001
REC/PB AMP
CN002 ⑯ PB
0.5Vp-p(H)
Q002
Q008
CH-2A REC SW
REC 2A (IC601 97 SYSCON)
CH-2B REC SW
REC 2B (IC601 95 SYSCON)
Q001
IC001 ① REC
0.2V/div. 0.1µsec/div.
Q009
RF SWP (IC601 99 SYSCON)
REC Y CONT (IC302 ⑫ SYSCON)
Q021
Q019
FLYING ERASE OSC
FE ON (IC601 ④ SYSCON)
Q020
ERASE CURR SW
ME/MP (Q160 ②, Q161 ②)
Q162 (1/2) Q163 (1/2)
E/L
L/E
(IC602 53 SYSCON)
Q160 (1/2) Q161 (1/2)
ME/MP
MP/ME
(IC601 72 SYSCON)
VA PB 5V
Q178
Q179
VIDEO 5V (W608 ③ POWER)
VA PB (IC601 74 SYSCON)
VA REC 5V
Q198
RP PB 5V
Q181
Q182
RP PB (IC601 ③ SYSCON)
MP/ME
ME HALF TRAP
MP HALF TRAP
Q183
Q167
Q189
REC Y RF
REC Y RF (VIDEO)
Q151, 152
6dB AMP + PEAKING
FL151
AFM TRAP 1.5M, 1.7M
AFM TRAP
Q153
CHROMA TRAP
Q154
RF EQ
Q155
PB RF PEAKING
Q158
ATT
PB Y RF (VIDEO)
TUNING FREQ. SW
L/E (Q162 ②, Q163 ②)
PB RF (AUDIO)
PB RF (SYSCON)
PB C RF (VIDEO)
Q197
C/ATF/AFM MIX AMP
REC AFM (AUDIO)
REC ATF (SYSCON)
REC C RF (VIDEO)
Q193, 194
GAIN SW
Q192
E-MP
D151, R173
E/L (Q162 ①, Q163 ①)
MP/ME (Q160 ①, Q161 ①)
ME/MP (Q160 ②, Q161 ②)

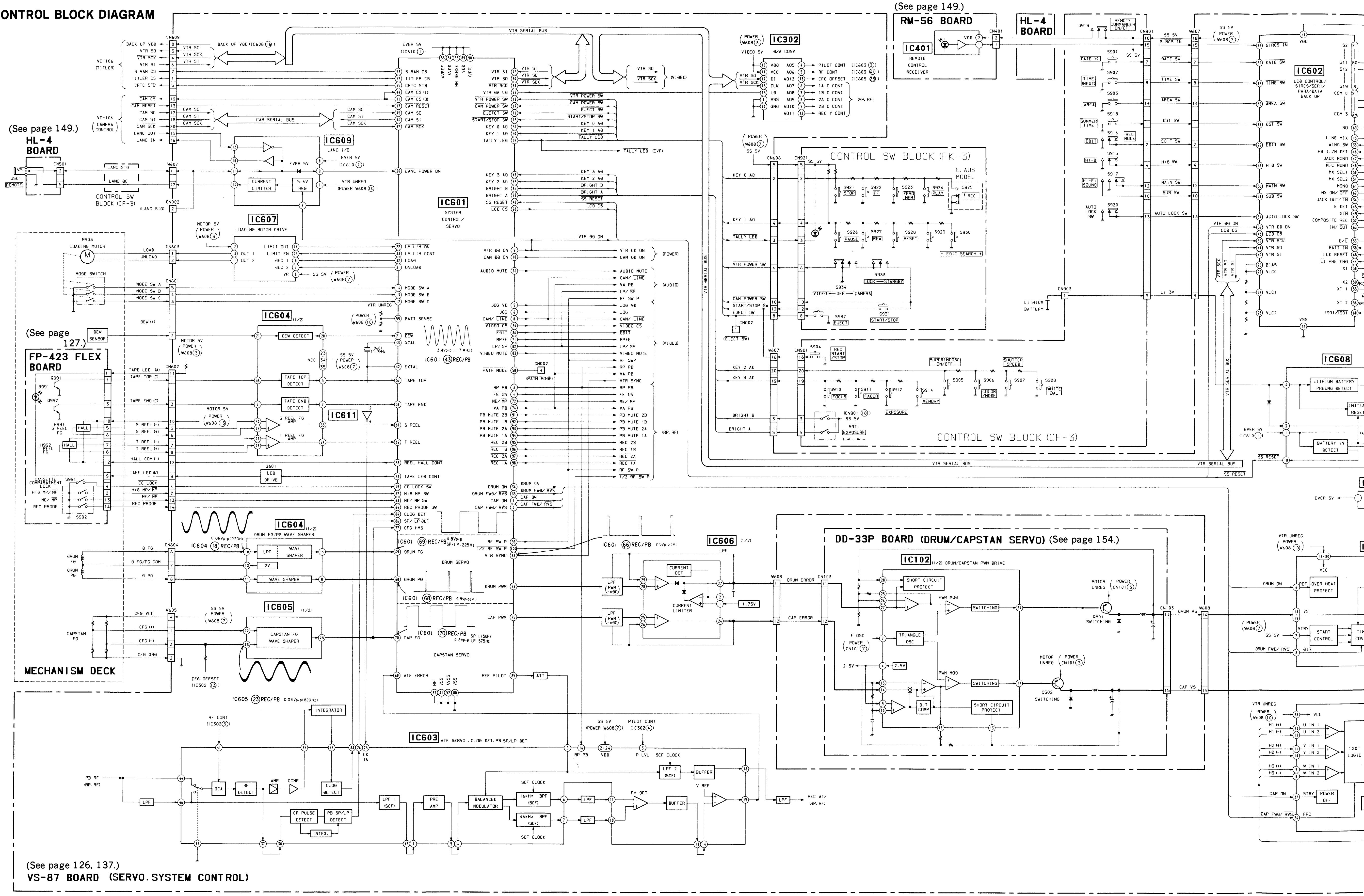
3-8. VIDEO BLOCK DIAGRAM


VC-106 BOARD (VIDEO)
(See page 93, 105, 121.)
IC401 Y PROCESS
IC501 CHROMA PROCESS
IC552
IC551
IC351 JOG CHROMA PROCESS
IC401 (45) PB 0.32Vp-p (H)
IC401 (43) PB 0.2V/div 0.1μsec/div
IC401 (43) REC 0.2V/div 0.1μsec/div
IC401 (47) PB 0.32Vp-p (H)
IC401 (50) PB 0.52Vp-p (H)
IC401 (28) PB 0.5Vp-p (H)
IC401 (28) REC 0.5Vp-p (H)
IC401 (38) PB 2Vp-p (H)
IC401 (32) REC/PB
IC401 (52) REC/PB
IC401 (30) REC 0.45Vp-p (H)
IC401 (30) PB 0.46Vp-p (H)
IC401 (3) REC/PB 0.52Vp-p (H)
IC401 (7) REC/PB 0.48Vp-p (H)
IC401 (13) PB 0.24Vp-p (H)
IC401 (5) PB 0.28Vp-p (H)
IC501 (30) REC/PB 0.15Vp-p (H)
IC501 (32) PB 0.28Vp-p (H)
IC501 (42) PB 0.2Vp-p (H)
IC501 (40) REC 0.48Vp-p (H)
IC501 (38) REC/PB 0.28Vp-p (H)
IC501 (8) REC/PB 0.18Vp-p(4.43MHz)
SOFT LIM OUT
Y RF
PB Y RF
DOP
PB C RF
REC C RF
LIMITER
FM MODULATOR
FM DE-MODULATOR
LPF
RF AGC
DOC DET
CLIP COMPEN
COMP TIME CONSTANT
MAIN EMPHASIS
SUB EMPHASIS
MAIN EMPHASIS TIME CONSTANT
E/L SWITCH
HALF H SHIFT CANCEL
DOC SWITCH
Y AGC DET
Y CORR DET
CLAMP
4.43MHz TRAP
Y AGC AMP
LIMITER
MUTE
DDS (CHARACTER) MIX
SYNC SEP
AGC DET
AGC AMP
INPUT SELECT
SYNC AGC
VIDEO AMP OUT
VIDEO OUT INHIBIT
Y/C MIX
NOISE CANSEL
CUT-OFF FREQUENCY SWITCH
PEAKING AMP
BUFFER
KNEE CLIP
Y COMB FILTER
COMB FILTER
CCD 1H DELAY
CCD 2H DELAY
CCD CLOCK
3fSC PLL
BUS DECODER
INVERT AMP
ACC DET
ACC CONT
ACC CHANNEL HOLD
BURST DE-EMPHASIS
CHROMA DE-EMPHASIS
REC CONVERTER
SECAM
BURST EMPHASIS
CHROMA EMPHASIS
PHASE SHIFT
CARRIER INVERT
BURST ID FF
BURST ID DET
CARRIER CONVERTER
4.43MHz VXO
375FH VCO
AFC FILTER
AFC DET
HALF H KILLER BURST FLAG
APC FILTER
APC DET
SYNC DET
PB CONVERTER
CROSSTALK
CORR
NO CORR
7.16MHz BPF
CHROMA MUTE
ACK SW
CHROMA EMPHASIS BPF
BPF FREQUENCY SWITCH
INV BUFFER
SEQUENCE DET
FREQUENCY CONVERTER
90° SHIFT
PHASE SHIFT
FM VCO
AFC 16
MASK
HALF H KILLER
BF GENERATOR
MODE
JOG SWITCH
QUAIS BURST
EVF VDW (TITLER)
VIDEO MUTE
VTR SYNC
JOG VD
HD INS
JOG DDP

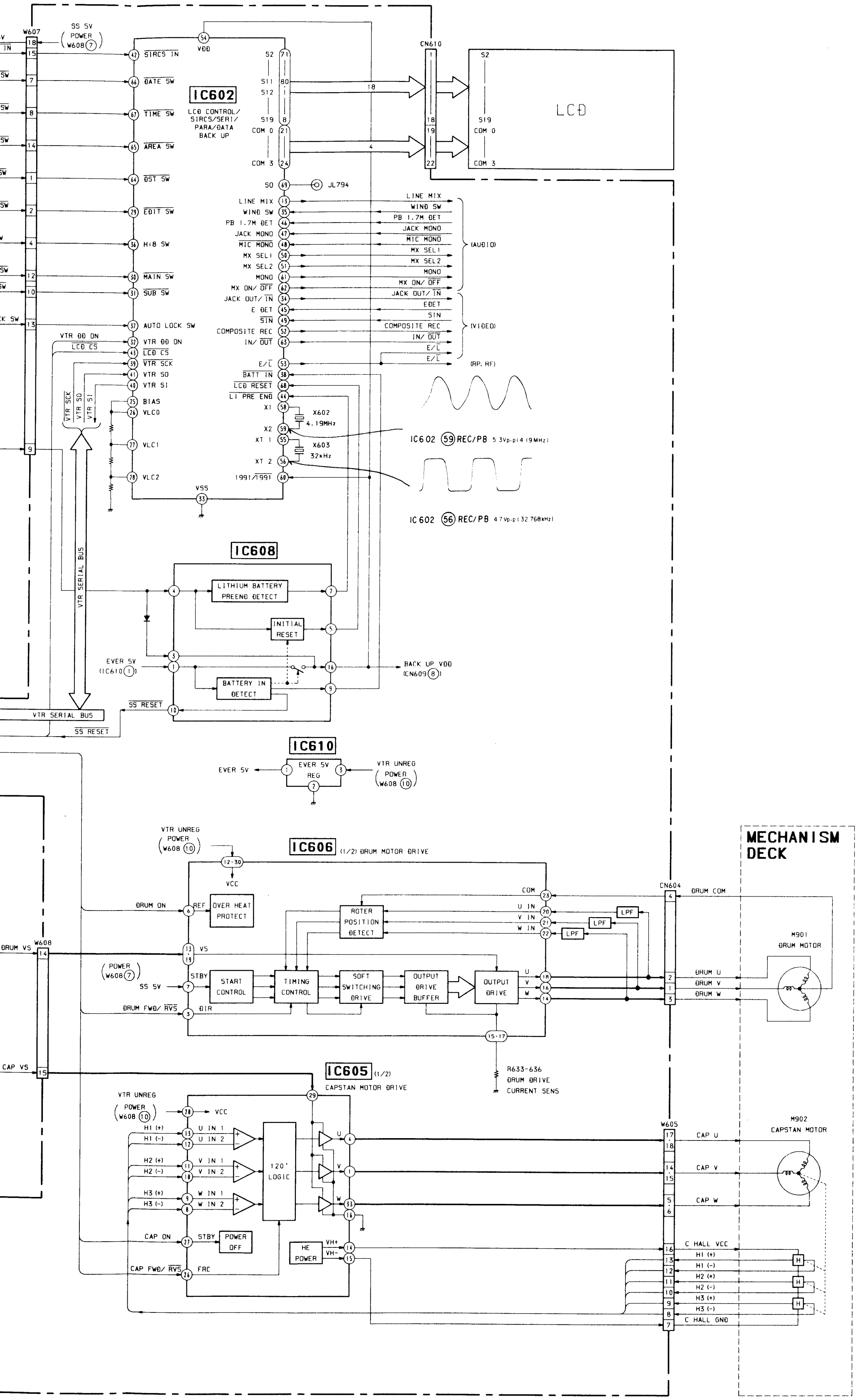

IC401 (38) PB 2Vp-p (H)
IC401 (32) REC/PB REC 0.45Vp-p(H) PB 2Vp-p(H)
IC401 (52) REC/PB REC 0.25Vp-p(H) PB 0.2Vp-p(H)
IC401 (3) REC/PB 0.52Vp-p (H)
IC401 (7) REC/PB 0.48Vp-p (H)
IC401 (5) PB 0.28Vp-p (H)
IC551
IC351
JOG CHROMA PROCESS
CCD 2H DELAY
VTR SYNC
SYNC SEP
AGC OFF
AGC DET
AGC AMP
INPUT SELECT
CLAMP
OSD (CHARACTER) MIX
SYNC AGC
VIDEO AMP OUT
VIDEO OUT INHIBIT
Y/C MIX
NOISE CANSEL
CUT-OFF FREQUENCY SWITCH
LIMITER
KNEE CLIP
Y COMB FILTER
CAM·REC+B/W·REC+S-LINE·REC
PEAKING AMP
PEAKING ON/OFF
4.43MHz TRAP
EMP LEVEL
BUFFER
COMB FILTER
REC···Y/C SEP
PB···CROSSTALK CANCEL
C ACC DET
INVERT AMP
Y/C SEP
C COMB
BUS DECODER
VIDEO CS
VTR SCK
VTR SO
TH CHROMA
DL CHROMA
PB CHROMA
APC LPF
FM VCO
AFC
MASK
HALF H KILLER
BF GENERATOR
C SYNC (IC401 (29))
JOG BOP-H6
HD INS
JOG BOP
W401
EVF VDW
EE PB Y
V OUT Y
S REC Y
VIDEO I/O
IN/OUT
VIDEO IN/OUT
VEE
S REC C
EE PB C
CAM C
CAM Y
(CAMERA)
FSC
COMPOSITE REC
JOG
VA PB
VIDEO 5V
EDIT
JOG V0
RF SWP
VIDEO MUTE
E/L
MP•E
LP/SP
PB Y RF
PB C RF
Y RF
REC C RF
BOP
SOFT LIM OUT
CN304
CN305
IC301
MUTE
EVF OUT
VIDEO MUTE (IC601 (89) SYSCON)
S VIDEO I/O
AMP
Y LEVEL
POWER SAVE
DRIVER
CAM/LINE
LEVEL CONVERT
CURRENT LIMITER
EVF VIDEO (VIEWFINDER)
CN301
CN303
S-Y I/O
S-C I/O
S IN
CN302
FSC (AUDIO)
JACK BOARD ASSY
S VIDEO
OUTPUT
INPUT
E, AUS MODEL
VIDEO
DC OUT
CN303 (4) REC/PB 1Vp-p(H)
CN304 (3) REC/PB 0.18Vp-p(4.43MHz)
VTR SYNC (IC601 (66))
COMPOSITE REC (IC602 (52))
JOG (IC601 (6))
VA PB (IC601 (74))
VIDEO CS (IC601 (24))
VTR SO (IC601 (80))
VTR SCK (IC601 (81))
(SYSCON)
JACK OUT/IN (IC601 (54))
IN/OUT (IC602 (63))
S IN (IC602 (49))
CAM/LINE (IC601 (8))
EDIT (IC601 (56))
JOG V0 (IC601 (5))
RF SWP (IC601 (99))
VIDEO MUTE (IC601 (85))
E/L (IC602 (58))
MP•E (IC601 (71))
LP/SP (IC601 (82))
IC151 E/L DISCRIMINATOR
RF IN
BOP
C SYNC
FSC
E DET
IC152
LIMITER AMP
SOFT LIMITER
LPF
HPF
TUNING FREQUENCY SWITCH
CUT OFF FREQUENCY SWITCH
(RP, RF)

VS-87 BOARD (I/O)
(See page 126, 137.)

3-9. SERVO, SYSTEM CONTROL BLOCK DIAGRAM



(See page 149.)
HL-4 BOARD
J501 REMOTE
CN501
LANC SIG
LANC DC
CONTROL SW BLOCK (CF-3)
VC-106 (TITLER)
VC-106 (CAMERA CONTROL)
CN609
VTR SERIAL BUS
CAM SERIAL BUS
IC609
LANC I/O
CURRENT LIMITER
5.6V REG
IC607
LOADING MOTOR DRIVE
M903 LOADING MOTOR
MODE SWITCH
MECHANISM DECK
(See page 127.)
DEW SENSOR
FP-423 FLEX BOARD
IC604 (1/2)
DEW DETECT
TAPE TOP DETECT
TAPE END DETECT
IC611
S REEL FG AMP
T REEL FG AMP
Q601 LED DRIVE
IC604 (1/2)
DRUM FG/PG WAVE SHAPER
IC604 ⑱REC/PB
WAVE SHAPER
IC605 (1/2)
CAPSTAN FG WAVE SHAPER
IC605 ㉓REC/PB
IC601
SYSTEM CONTROL/ SERVO
IC601 ㊸REC/PB
DRUM SERVO
CAPSTAN SERVO
IC601 ⑯REC/PB
IC601 ⑱REC/PB
IC601 ⑳REC/PB
IC601 ⑯REC/PB
IC606 (1/2)
CURRENT DET
CURRENT LIMITER
IC603
ATF SERVO, CLOG DET, PB SP/LP DET
INTEGRATOR
AGC
RF DETECT
AMP
COMP
CLOG DETECT
CR PULSE DETECT
PB SP/LP DETECT
INTEG.
LPF 1 (SCF)
PRE AMP
BALANCED MODULATOR
16kHz BPF (SCF)
46kHz BPF (SCF)
FH DET
BUFFER
LPF 2 (SCF)
REC ATF
(See page 126, 137.)
VS-87 BOARD (SERVO, SYSTEM CONTROL)
IC302
D/A CONV
(See page 149.)
RM-56 BOARD
IC401
REMOTE CONTROL RECEIVER
HL-4 BOARD
CONTROL SW BLOCK (FK-3)
CONTROL SW BLOCK (CF-3)
IC602
LCD CONTROL/ SIRCS/SERI/ PARA/DATA BACK UP
IC608
LITHIUM BATTERY PREEND DETECT
BATTERY IN DETECT
LITHIUM BATTERY
DD-33P BOARD (DRUM/CAPSTAN SERVO) (See page 154.)
IC102 (1/2) DRUM/CAPSTAN PWM DRIVE
SHORT CIRCUIT PROTECT
TRIANGLE OSC
SWITCHING
D.T COMP
Q501 SWITCHING
Q502 SWITCHING
OVER HEAT PROTECT
START CONTROL
POWER OFF
120° LOGIC


IC602
LCD CONTROL/ SIRCS/SERI/ PARA/DATA BACK UP
LCD
CN610
IC608
LITHIUM BATTERY PREEND DETECT
INITIAL RESET
BATTERY IN DETECT
VTR SERIAL BUS
SS RESET
BACK UP VDD
IC610
EVER 5V REG
EVER 5V
VTR UNREG
IC606
(1/2) DRUM MOTOR DRIVE
OVER HEAT PROTECT
ROTER POSITION DETECT
START CONTROL
TIMING CONTROL
SOFT SWITCHING DRIVE
OUTPUT DRIVE BUFFER
OUTPUT DRIVE
LPF
DRUM ON
DRUM FWD/RVS
CN604
DRUM COM
DRUM U
DRUM V
DRUM W
M901 DRUM MOTOR
MECHANISM DECK
IC605
(1/2) CAPSTAN MOTOR DRIVE
120° LOGIC
STBY POWER OFF
HE POWER
R633-636 DRUM DRIVE CURRENT SENS
CAP ON
CAP FWD/RVS
CAP VS
W605
CAP U
CAP V
CAP W
M902 CAPSTAN MOTOR
C HALL VCC
H1 (+)
H1 (-)
H2 (+)
H2 (-)
H3 (+)
H3 (-)
C HALL GND
IC602 (59) REC/PB 5.3Vp-p(4.19MHz)
IC602 (56) REC/PB 4.7Vp-p(32.768kHz)
X602 4.19MHz
X603 32kHz
(AUDIO)
(VIDEO)
(RP, RF)

3-10. SERVO, SYSTEM CONTROL TERMINAL DESCRIPTION VS-87 BOARD IC601 (CXP80624)

<table>
<tr><th>Pin No.</th><th>Signal Name</th><th>I/O</th><th>Function</th></tr>
<tr><td>1</td><td>CAP ON</td><td>O</td><td>Capstan driver ON control signal</td></tr>
<tr><td>2</td><td>CAP FWD/RVS</td><td>O</td><td>Capstan rotation direction control signal. "High" : FWD ; "Low" : RVS.</td></tr>
<tr><td>3</td><td>RP PB</td><td>O</td><td>REC/PB mode changeover signal for REC/PB amplifier (VS-87 board IC001,002), ATF IC</td></tr>
<tr><td>4</td><td>FE ON</td><td>O</td><td>Flying erase oscillation ON/OFF signal. "Low" : oscillation ON.</td></tr>
<tr><td>5</td><td>JOG VD</td><td>O</td><td>Quasi VD output to be inserted into video signal when variable speed playback is executed.</td></tr>
<tr><td>6</td><td>JOG</td><td>O</td><td>Normal/JOG mode changeover signal. "High" : JOG mode.</td></tr>
<tr><td>7</td><td>CAM RESET</td><td>O</td><td>Camera microcomputer reset signal</td></tr>
<tr><td>8</td><td>CAM/LINE</td><td>O</td><td>Camera/line changeover output. "High" : camera mode ; "Low" : VTR mode.</td></tr>
<tr><td>9</td><td>VTR DD ON</td><td>O</td><td>DC-DC converter (VTR system) control signal</td></tr>
<tr><td>10</td><td>CAM DD ON</td><td>O</td><td>DC-DC converter (camera system) control signal</td></tr>
<tr><td>11</td><td>CAM CS (O)</td><td>O</td><td>Chip select signal for communications between camera and microcomputer</td></tr>
<tr><td>12</td><td>MODE SW C</td><td>I</td><td rowspan="3">Mechanical position input (MODE switch)</td></tr>
<tr><td>13</td><td>MODE SW B</td><td>I</td></tr>
<tr><td>14</td><td>MODE SW A</td><td>I</td></tr>
<tr><td>15</td><td>START/ STOP SW</td><td>I</td><td>START/STOP switch input (microcomputer standby release input)</td></tr>
<tr><td>16</td><td>EJECT SW</td><td>I</td><td>EJECT switch input (microcomputer standby release input)</td></tr>
<tr><td>17</td><td>CAM POWER SW</td><td>I</td><td>CAMERA POWER switch input (microcomputer standby release input)</td></tr>
<tr><td>18</td><td>VTR POWER SW</td><td>I</td><td>VTR POWER switch input (microcomputer standby release input)</td></tr>
<tr><td>19</td><td>CC LOCK SW</td><td>I</td><td>CASSETTE IN switch input. "Low" : Cassette IN.</td></tr>
<tr><td>20</td><td>LANC POWER ON</td><td>I</td><td>Input to turn this unit ON with LANC (microcomputer standby release input)</td></tr>
<tr><td>21</td><td>DEW DET</td><td>I</td><td>Condensation sensor input. "Low" : condensing.</td></tr>
<tr><td>22</td><td>LM LIM ON</td><td>I</td><td>Loading motor current limiter operation detection signal</td></tr>
<tr><td>23</td><td>SRAM CS</td><td>O</td><td>Chip select signal to SRAM (TI-40 board IC801)</td></tr>
<tr><td>24</td><td>VIDEO CS</td><td>O</td><td>Chip select signal to video IC (VC-106 board IC401)</td></tr>
<tr><td>25</td><td>CRTC STB</td><td>O</td><td>Strobe signal for character generator (TI-40 board IC802)</td></tr>
<tr><td>26</td><td>AUDIO MUTE</td><td>O</td><td>Audio Mute signal to AFM IC (AU-121 board IC801, IC802)</td></tr>
<tr><td>27</td><td>TITLER CS</td><td>O</td><td>Chip select signal to digital titler (TI-40 board IC803)</td></tr>
<tr><td>28</td><td>LCD CS</td><td>O</td><td>Chip select signal to LCD microcomputer (VS-87 board IC602)</td></tr>
<tr><td>29</td><td>VTR DA LD</td><td>O</td><td>Data load signal to EVR (VS-87 board IC302)</td></tr>
<tr><td>30</td><td>N.C</td><td></td><td></td></tr>
<tr><td>31</td><td>UNLOAD</td><td>O</td><td rowspan="2">Loading motor control signal
<table>
<tr><th></th><th>OFF</th><th>LOADING</th><th>UNLOADING</th><th>BRAKE</th></tr>
<tr><td>LOAD</td><td>Low</td><td>High</td><td>Low</td><td>High</td></tr>
<tr><td>UNLOAD</td><td>Low</td><td>Low</td><td>High</td><td>High</td></tr>
</table>
(The microcomputer terminal is N-ch open drain.)</td></tr>
<tr><td>32</td><td>LOAD</td><td>O</td></tr>
<tr><td>33</td><td>LM LIM CONT</td><td>O</td><td>Loading motor driver current limiter control signal (N-ch open drain)</td></tr>
<tr><td>34</td><td>DRUM ON</td><td>O</td><td>Drum motor drive control signal Z : Motor ON (N-ch open drain)</td></tr>
</table>

Pin No.	Signal Name	I/O	Function
35	DRUM FWD/ $\overline{\text{RVS}}$	O	Drum rotation direction control signal. "Low" : RVS ; "High" : FWD (N-ch open drain).
36	$\overline{\text{EDIT}}$	O	EDIT ON/OFF control signal. "Low" : EDIT, interlocked with EDIT key (N-ch open drain).
37	TALLY LED	O	External TALLY LED/EVF internal TALLY drive LED illumination. When the LED is illuminated, this output becomes "Low" (N-ch open drain).
38	$\overline{\text{REEL HALL CONT}}$	O	Reel sensor control signal. "Low" : Sensor ON (N-ch open drain).
39	MP	I	Microprocessor mode select pin, not selected in this unit.
40	$\overline{\text{SS RESET}}$	I	Reset pin
41	VSS	—	GND
42	XTAL	O	Clock oscillation (The clock is supplied to ATF IC from this unit.)
43	EXTAL	I	
44	$\overline{\text{CAM CS}}$ (I)	I	Automatic transfer control circuit for communications with camera microcomputer
45	CAM SO	I	Serial data input from camera microcomputer
46	CAM SI	O	Serial data output to camera microcomputer
47	$\overline{\text{CAM SCK}}$	I	Serial clock input from camera microcomputer
48	KEY 3 AD	I	A/D input for key read, CF block (camera system function)
49	KEY 2 AD	I	
50	KEY 1 AD	I	A/D input for key read, FK block (VTR system function)
51	KEY 0 AD	I	
52	AVSS	—	A/D converter GND
53	AVREF	—	A/D converter Reference voltage
54	AVDD	—	A/D converter power
55	HH SENSE	I	Not used (connected to VDD)
56	TAPE END	I	Tape end sensor input. "High" : Tape end.
57	TAPE TOP	I	Tape top sensor input. "High" : Tape top.
58	PATH MODE	I	Tape path adjustment mode input pin. Normally "High". When adjustment is made, this input becomes "Low".
59	BATT SENSE	I	Battery end/pre end voltage input. A/D input pin.
60	ATF ERROR	I	ATF error (ATF LOCK error) input. A/D input pin.
61	S REEL	I	Supply side reel sensor Input. A/D input pin.
62	T REEL	I	Takeup side reel sensor input. A/D input pin.
63	ME/$\overline{\text{MP}}$ SW	I	ME/MP tape discrimination input. "High" : ME tape.
64	REC PROOF SW	I	Careless erase prevention discrimination input. "High" : Careless erase prevention.
65	BRIGHT B	I	Brightness control dial input (B phase)
66	VTR SYNC	I	Composite sync signal input
67	Hi8 MP SW	I	Hi8 MP tape discrimination input. "High" : Hi8 MP tape.
68	DRUM PG	I	Drum PG input FRC (high precision timer) capture input pin
69	DRUM FG	I	Drum PG input FRC (high precision timer) capture input pin.
70	CAP FG	I	Capstan FG input FRC (high precision timer) capture input pin
71	MP * E	O	When a Hi8 MP tape is used and E mode is activated, this output becomes "High".
72	ME/$\overline{\text{MP}}$	O	ME/MP tape discrimination output. "High" : ME tape.

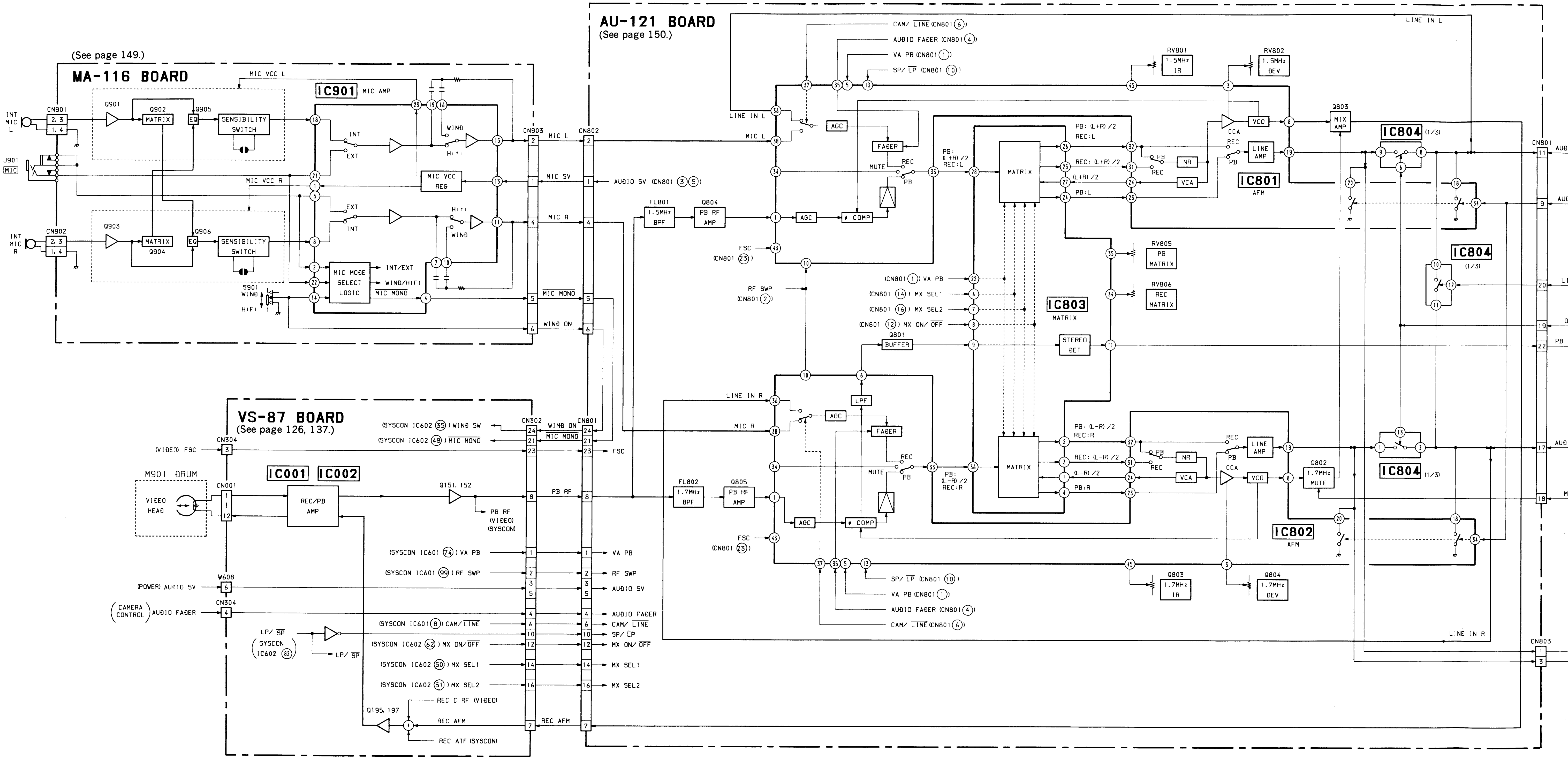
Pin No.	Signal Name	I/O	Function
73	TAPE LED CONT	O	Tape top/end sensor LED drive control. "High" : LED ON.
74	VA PB	O	Video/audio system REC/PB mode changeover. "High" : PB mode.
75	CAP PWM	O	PWM output pin for capstan error output. Output pin dedicated to servo (PWM mode).
76	DRUM PWN	O	PWM output pin for drum error output. Output pin dedicated to servo (PWM mode).
77	CFG HMS	I	HMS counter capstan FG input (Event counter input)
78	BRIGHT A	I	Brightness control dial input (A phase)
79	VTR SI	I	Serial data input from LCD microcomputer
80	VTR SO	O	Serial data output to VTR system
81	$\overline{\text{VTR SCK}}$	O	Serial clock output to VTR system
82	LP/$\overline{\text{SP}}$	O	SP/LP mode discrimination signal output. "Low" : SP mode.
83	VIDEO MUTE	O	Video mute output to VTR system
84	CLOG DET	O	Clog detection signal input. "High" : Clog.
85	REF PILOT	O	ATF IC ATF reference pilot signal output
86	SP/$\overline{\text{LP}}$ DET	I	SP/LP mode discrimination signal input. "High" : SP mode, during FF, REV, CUE, REV, EDIT(—).
87	NC	—	
88	VSS	—	GND
89	VDD	—	EVER 5V
90	(VPP)	—	EVER 5V
91	PB MUTE 2B	O	Control signal for preventing crosstalk from other head in playback mode. "High" : Mute
92	PB MUTE 1B	O	
93	PB MUTE 2A	O	
94	PB MUTE 1A	O	
95	$\overline{\text{REC 2B}}$	O	Drum head (1A, 2A, 1B, 2B) changeover recording timing signal. "Low" : REC.
96	$\overline{\text{REC 1B}}$	O	
97	$\overline{\text{REC 2A}}$	O	
98	$\overline{\text{REC 1A}}$	O	
99	RF SWP	O	RF SWP output pin
100	$\overline{\text{1/2 RF SWP}}$	O	1/2 RF SWP output pin. "Low" : A-ch ; "High" B-ch.

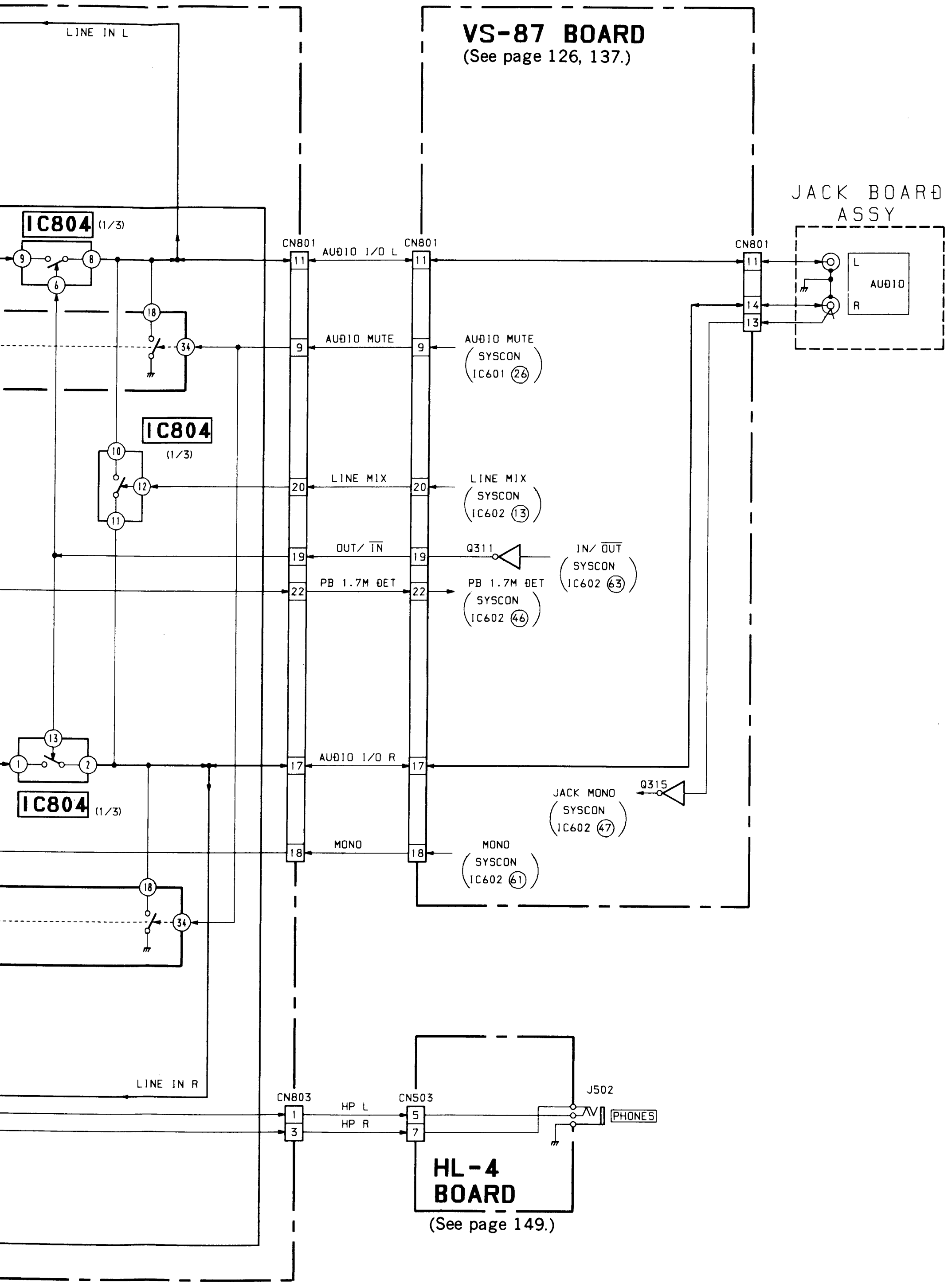
3-11. MODE CONTROL TERMINAL DESCRIPTION VS-87 BOARD IC602 (μPD75304)

Pin No.	Signal Name	I/O	Function
1	S12	O	Segment signal output
2	S13	O	LCD segment terminal drive
3	S14	O	LCD segment signal output pin (Output of one of four values: 0, 1.7, 3.3, 5V).
4	S15	O	
5	S16	O	
6	S17	O	
7	S18	O	
8	S19	O	
9	(S20)	O	Not used
10	(S21)	O	
11	(S22)	O	
12	(S23)	O	
13	LINE MIX	O	Audio system control signal
14	(S25)	O	Not used
15	(S26)	O	
16	(S27)	O	
17	(S28)	O	
18	(S29)	O	
19	(S30)	O	
20	(S31)	O	
21	COM 0	O	LCD common terminal drive output for common signal output
22	COM 1	O	
23	COM 2	O	
24	COM 3	O	
25	BIAS	O	Output pin used for external split resistor cut. Power input.
26	VLC 0	I	Power for LCD drive. Normally 0V. For backup, 3V is input.
27	VLC 1	I	Power for LCD drive. Normally 1.7V. For backup, 3V is input.
28	VLC 2	I	Power for LCD drive. Normally 3.3V. For backup, 3V is input.
29	$\overline{\text{EDIT SW}}$	I	Edit switch input
30	$\overline{\text{MAIN SW}}$	I	Bilingual main switch input
31	$\overline{\text{SUB SW}}$	I	Bilingual sub switch input
32	VTR DD ON	I	VTR system power control signal input
33	VSS	—	GND
34	JACK OUT/$\overline{\text{IN}}$	I	Line input/output chanegover switch input
35	WIND SW	I	Wind reduction switch input
36	Hi8 SW	I	Hi8 auto/OFF switch input
37	AUTO LOCK SW	I	Auto lock switch input
38	$\overline{\text{BATT IN}}$	I	Set "Low" to switch to 32 kHz clock. Set "High" to switch to 4.19MHz clock. When battery is OFF, set "Low".
39	$\overline{\text{VTR SCK}}$	I	Serail clock input from servo/system control
40	VTR SI	O	Serial data input from servo/system control
41	VTR SO	I	Serial data input from servo/system control
42	$\overline{\text{SIRCS IN}}$	I	SIRCS signal input

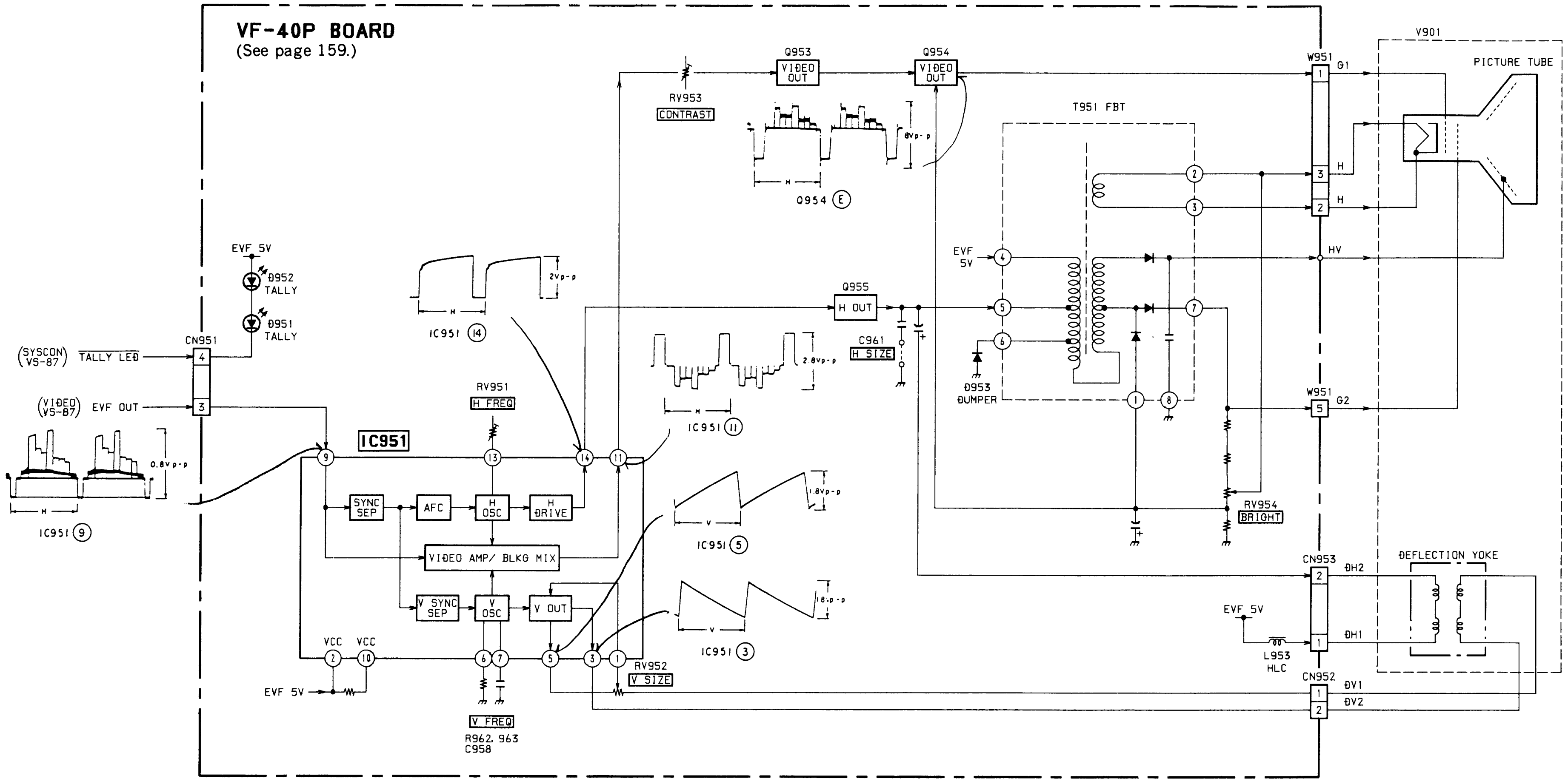
Pin No.	Signal Name	I/O	Function
43	$\overline{\text{LCD CS}}$	I	Chip select signal from servo/system control
44	$\overline{\text{LI PRE END}}$	I	Lithium battery pre end detection. Normally "High". When battery voltage is reduced, this input becomes "Low".
45	E DET	I	Hi8/normal discrimination input in playback mode. "High": Hi8.
46	PB 1.7M DET	I	Input which discriminates between stereo and bilingual/monoral in playback mode. "High": Stereo or bilingual.
47	JACK MONO	I	Audio line IN/OUT jack monoral detection
48	$\overline{\text{MIC MONO}}$	I	Mic jack monoral detection
49	$\overline{\text{S IN}}$	I	S video connector connected/not connected detection
50	MX SEL 1	O	Audio block L-ch/R-ch select signal
51	MX SEL 2	O	
52	COMPOSITE REC	O	When VTR mode, line input is selected, this output becomes "High".
53	E/L	O	Hi8/Normal mode output. "High": Hi8.
54	VDD	—	Back up VDD
55	XT1	I	Clock oscillation 32kHz
56	XT2	O	
57	NC		
58	X1	I	Clock oscillation 4.19MHz
59	X2	O	
60	1991/$\overline{\text{1991}}$	I	Date setting. "High": Start from 1991; "Low": Start from 1990. This input is set "High" in this unit.
61	MONO	O	Stereo/monoral changeover output. "High": Monoral.
62	MX ON/$\overline{\text{OFF}}$	O	Matrix IC ON/OFF signal
63	IN/$\overline{\text{OUT}}$	O	INPUT/OUTPUT changeover output
64	$\overline{\text{DST SW}}$	I	Summer time switch input
65	$\overline{\text{AREA SW}}$	I	Area switch input
66	$\overline{\text{DATE SW}}$	I	Date switch input
67	$\overline{\text{TIME SW}}$	I	Time switch input
68	$\overline{\text{LCD RESET}}$	I	Reset
69	S0	O	Clock oscillation circuit dividing output (512kHz)
70	S1		LCD segment signal output pin. Not used.
71	S2	O	LCD segment signal output pin (output of one of four values: 0, 1.7, 3.3 and 5V).
72	S3	O	
73	S4	O	
74	S5	O	
75	S6	O	
76	S7	O	
77	S8	O	
78	S9	O	
79	S10	O	
80	S11	O	

3-12. AUDIO BLOCK DIAGRAM

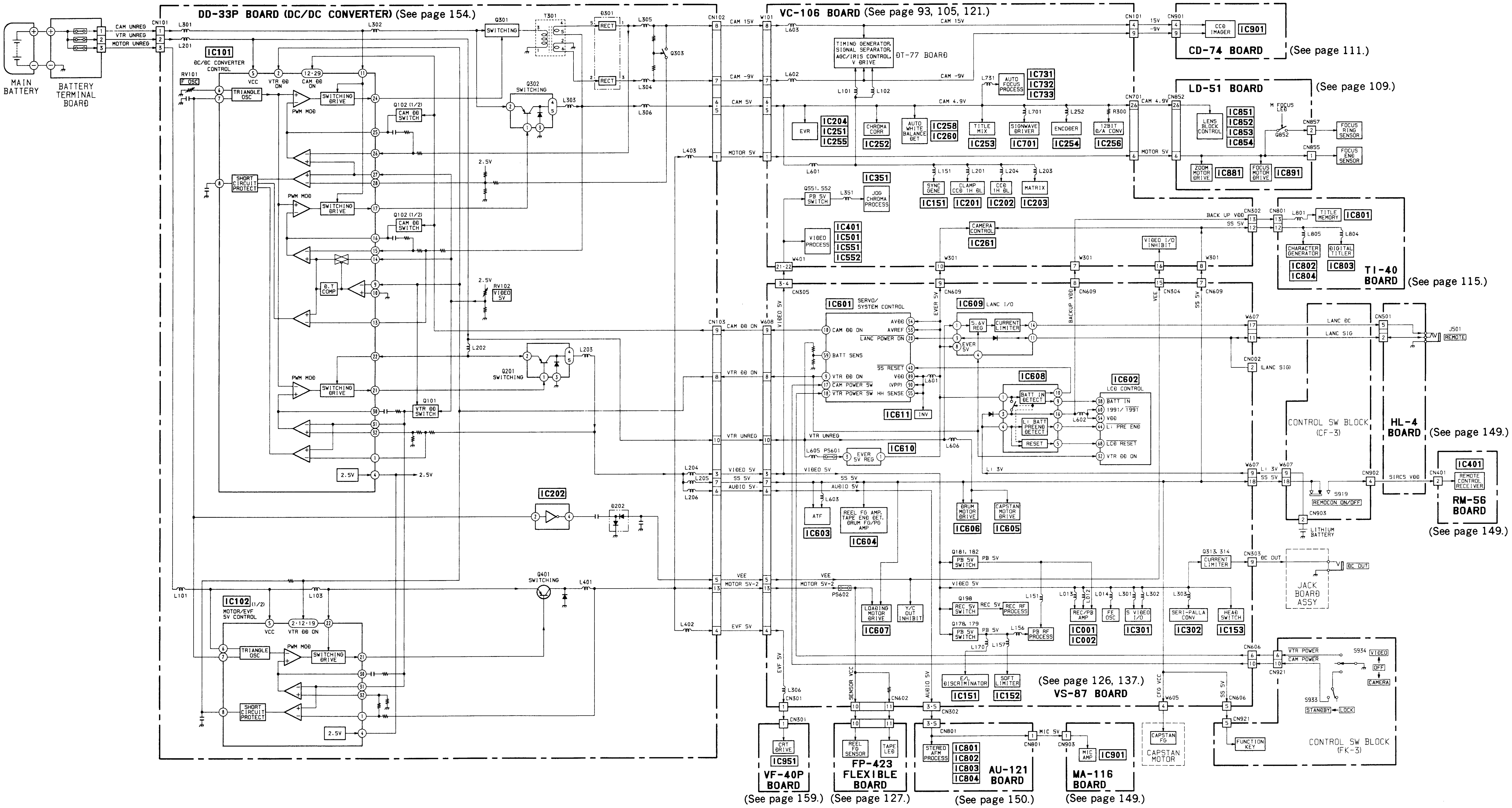

MA-116 BOARD
(See page 149.)
VS-87 BOARD
(See page 126, 137.)
AU-121 BOARD
(See page 150.)
INT MIC L
INT MIC R
J901 MIC
CN901
CN902
Q901
Q902 MATRIX
Q903
Q904 MATRIX
Q905 EQ
Q906 EQ
SENSIBILITY SWITCH
IC901 MIC AMP
MIC VCC L
MIC VCC R
INT
EXT
WIND
HiFi
MIC VCC REG
MIC MODE SELECT LOGIC
INT/EXT
WIND/HiFi
MIC MONO
S901 WIND HiFi
CN903
CN802
MIC L
MIC 5V
MIC R
MIC MONO
WIND ON
AUDIO 5V (CN801 ③⑤)
CN302
CN801
(SYSCON IC602 ㉟) WIND SW
(SYSCON IC602 ㊽) MIC MONO
(VIDEO) FSC
CN304
M901 DRUM
VIDEO HEAD
CN001
IC001
IC002
REC/PB AMP
Q151, 152
PB RF (VIDEO) (SYSCON)
PB RF
FSC
(SYSCON IC601 ㊹) VA PB
(SYSCON IC601 (99)) RF SWP
W608
(POWER) AUDIO 5V
(CAMERA CONTROL) AUDIO FADER
LP/SP
(SYSCON IC602 (82))
(SYSCON IC601 ⑧) CAM/LINE
(SYSCON IC602 (62)) MX ON/OFF
(SYSCON IC602 ㊿) MX SEL1
(SYSCON IC602 (51)) MX SEL2
REC C RF (VIDEO)
REC AFM
REC ATF (SYSCON)
Q195, 197
VA PB
RF SWP
AUDIO 5V
AUDIO FADER
CAM/LINE
SP/LP
MX ON/OFF
MX SEL1
MX SEL2
CAM/LINE (CN801 ⑥)
AUDIO FADER (CN801 ④)
VA PB (CN801 ①)
SP/LP (CN801 ⑩)
LINE IN L
LINE IN R
MIC L
MIC R
AGC
FADER
MUTE
REC
PB
COMP
FL801 1.5MHz BPF
Q804 PB RF AMP
FL802 1.7MHz BPF
Q805 PB RF AMP
FSC (CN801 ㉓)
RF SWP (CN801 ②)
LPF
PB: (L+R)/2 REC: L
PB: (L-R)/2 REC: R
MATRIX
REC: (L+R)/2
(L+R)/2
PB: L
REC: (L-R)/2
(L-R)/2
PB: R
(CN801 ①) VA PB
(CN801 ⑭) MX SEL1
(CN801 ⑯) MX SEL2
(CN801 ⑫) MX ON/OFF
Q801 BUFFER
IC803 MATRIX
STEREO DET
RV805 PB MATRIX
RV806 REC MATRIX
RV801 1.5MHz IR
RV802 1.5MHz DEV
Q803 1.7MHz IR
Q804 1.7MHz DEV
VCO
CCA
NR
VCA
LINE AMP
IC801 AFM
IC802 AFM
Q803 MIX AMP
Q802 1.7MHz MUTE
IC804 (1/3)
CN801
CN803
REC AFM
AUD
PB


LINE IN L
VS-87 BOARD
(See page 126, 137.)
JACK BOARD ASSY
IC804 (1/3)
CN801
AUDIO I/O L
AUDIO
L
R
AUDIO MUTE
AUDIO MUTE (SYSCON IC601 ㉖)
IC804 (1/3)
LINE MIX
LINE MIX (SYSCON IC602 ⑬)
OUT/ IN
Q311
IN/ OUT (SYSCON IC602 63)
PB 1.7M DET
PB 1.7M DET (SYSCON IC602 46)
AUDIO I/O R
JACK MONO (SYSCON IC602 47)
Q315
IC804 (1/3)
MONO
MONO (SYSCON IC602 61)
LINE IN R
CN803
CN503
HP L
HP R
J502
PHONES
HL-4 BOARD
(See page 149.)

3-13. VIEWFINDER BLOCK DIAGRAM


VF-40P BOARD
(See page 159.)
RV953
CONTRAST
Q953 VIDEO OUT
Q954 VIDEO OUT
Q954 Ⓔ
8Vp-p
H
T951 FBT
W951
G1
V901
PICTURE TUBE
H
EVF 5V
D952 TALLY
D951 TALLY
(SYSCON VS-87) TALLY LED
CN951
(VIDEO VS-87) EVF OUT
0.8Vp-p
IC951 ⑨
2Vp-p
IC951 ⑭
RV951
H FREQ
IC951
Q955
H OUT
C961
H SIZE
2.8Vp-p
IC951 ⑪
D953 DUMPER
HV
G2
SYNC SEP
AFC
H OSC
H DRIVE
VIDEO AMP/ BLKG MIX
1.8Vp-p
IC951 ⑤
RV954
BRIGHT
V SYNC SEP
V OSC
V OUT
18Vp-p
IC951 ③
VCC
VCC
EVF 5V
RV952
V SIZE
V FREQ
R962, 963 C958
CN953
DH2
DH1
DEFLECTION YOKE
L953 HLC
CN952
DV1
DV2

3-14. POWER BLOCK DIAGRAM


MAIN BATTERY
BATTERY TERMINAL BOARD
CAM UNREG
VTR UNREG
MOTOR UNREG
DD-33P BOARD (DC/DC CONVERTER) (See page 154.)
IC101
DC/DC CONVERTER CONTROL
TRIANGLE OSC
SWITCHING DRIVE
PWM MOD
SHORT CIRCUIT PROTECT
Q102 (1/2) CAM DD SWITCH
Q301 SWITCHING
T301
D301
RECT
Q302 SWITCHING
Q303
Q201 SWITCHING
Q101 VTR DD SWITCH
IC202
D202
IC102 (1/2) MOTOR/EVF 5V CONTROL
Q401 SWITCHING
2.5V
RV101
RV102 VIDEO 5V
CN101
CN102
CN103
CAM 15V
CAM -9V
CAM 5V
MOTOR 5V
CAM DD ON
VTR DD ON
VTR UNREG
VIDEO 5V
SS 5V
AUDIO 5V
VEE
MOTOR 5V-2
EVF 5V
VC-106 BOARD (See page 93, 105, 121.)
TIMING GENERATOR, SIGNAL SEPARATOR, AGC/IRIS CONTROL, V DRIVE
DT-77 BOARD
IC731 IC732 IC733
AUTO FOCUS PROCESS
IC204 IC251 IC255
EVR
CHROMA CORR
IC252
AUTO WHITE BALANCE DET
IC258 IC260
TITLE MIX
IC253
SINEWAVE DRIVER
IC701
ENCODER
IC254
12BIT D/A CONV
IC256
IC351
SYNC GENE
CLAMP CCD 1H DL
CCD 1H DL
MATRIX
IC151 IC201 IC202 IC203
Q551, 552 PB 5V SWITCH
JOG CHROMA PROCESS
VIDEO PROCESS
IC401 IC501 IC551 IC552
CAMERA CONTROL
IC261
VIDEO I/O INHIBIT
IC601 SERVO/SYSTEM CONTROL
IC609 LANC I/O
5.6V REG
CURRENT LIMITER
EVER 5V
IC608
BATT IN DETECT
LI BATT PREEND DETECT
RESET
IC602 LCD CONTROL
IC611 INV
IC610
EVER 5V REG
ATF
IC603
REEL FG AMP, TAPE END DET, DRUM FG/PG AMP
IC604
DRUM MOTOR DRIVE
IC606
CAPSTAN MOTOR DRIVE
IC605
Q181, 182 PB 5V SWITCH
Q198 REC 5V SWITCH
REC RF PROCESS
Q178, 179 PB 5V SWITCH
PB RF PROCESS
REC/PB AMP
FE OSC
S VIDEO I/O
IC001 IC002
IC301
SERI-PALLA CONV
IC302
HEAD SWITCH
IC153
LOADING MOTOR DRIVE
IC607
Y/C OUT INHIBIT
E/L DISCRIMINATOR
IC151
SOFT LIMITER
IC152
(See page 126, 137.) VS-87 BOARD
CD-74 BOARD (See page 111.)
CCD IMAGER
IC901
LD-51 BOARD (See page 109.)
LENS BLOCK CONTROL
IC851 IC852 IC853 IC854
ZOOM MOTOR DRIVE
IC881
FOCUS MOTOR DRIVE
IC891
FOCUS RING SENSOR
FOCUS END SENSOR
TITLE MEMORY
IC801
CHARACTER GENERATOR
DIGITAL TITLER
IC802 IC804 IC803
TI-40 BOARD (See page 115.)
LANC DC
LANC SIG
J501 REMOTE
CONTROL SW BLOCK (CF-3)
HL-4 BOARD (See page 149.)
IC401
REMOTE CONTROL RECEIVER
RM-56 BOARD (See page 149.)
S919 REMOCON ON/OFF
LITHIUM BATTERY
Q313, 314 CURRENT LIMITER
DC OUT
JACK BOARD ASSY
VTR POWER
CAM POWER
S934 VIDEO OFF CAMERA
S933 STANDBY LOCK
FUNCTION KEY
CONTROL SW BLOCK (FK-3)
CRT DRIVE
IC951
VF-40P BOARD (See page 159.)
REEL FG SENSOR
TAPE LED
FP-423 FLEXIBLE BOARD (See page 127.)
STEREO AFM PROCESS
IC801 IC802 IC803 IC804
AU-121 BOARD (See page 150.)
MIC AMP
IC901
MA-116 BOARD (See page 149.)
CAPSTAN FG
CAPSTAN MOTOR

SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

· For printed wiring boards.

- ▨ : Pattern from the side which enables seeing.

(The other layers'patterns are not indicated.)

Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component side)	Parts on the parts face side seen from the parts face are indicated.

· For schematic diagrams.

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minuts side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/8W or less unless otherwise noted.
  kΩ : 1000Ω , MΩ : 1000kΩ .
- All capacitors are in μF unless otherwise noted. pF: μ μF.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- ☐ : panel designation.
- △ : internal component.
- ☐ : adjustment for repeair. *
- —— : B+ Line. *
- - - - : B– Line. *
- ⇨ : IN/OUT direction of (+, –) B LINE. *
- Circled numbers refer to waveforms. *

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

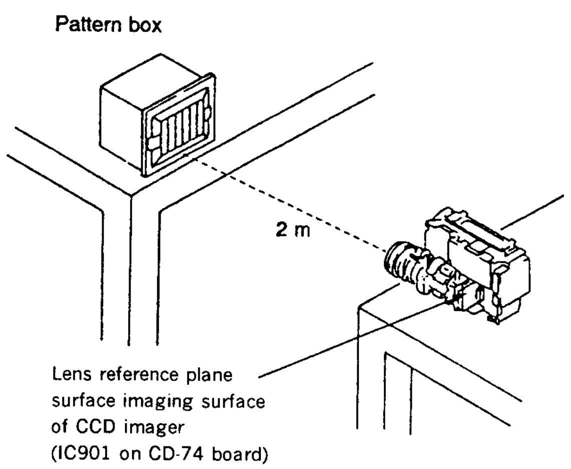
When indicating parts by reference number, please include the board name.

* indicated by the color red.

· Measuring conditions voltage value and waveform.
(CAMERA REC MODE)

- The object is color bar chart of pattern box. *
- Voltages are dc between ground and measurement points. *
  Readings are taken with a digital multimeter (DC 10MΩ). *
- Voltage variations may be noted due to normal production tolerances. *

1. Connection



2. Adjust the distance so that the output waveform of Fig. a and the Fig. b can be obtain.

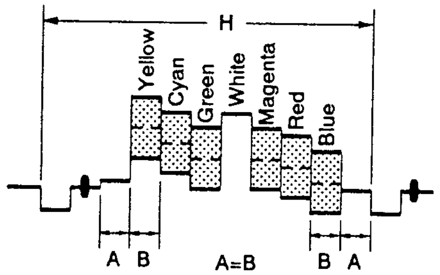


Fig. a (Video output terminal output waveform)

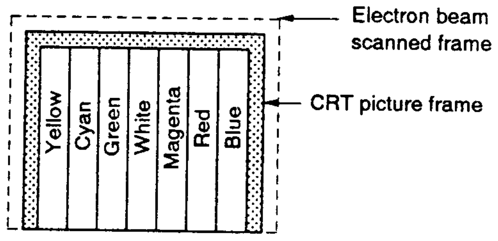


Fig. b (Picture on monitor TV)

(VTR REC or VTR PB mode)

- Voltages are dc between ground and measurement points. *
- Readings are taken with a color-bar signal input. *
- Readings are taken with a digital multimeter (DC10MΩ). *
- Voltage variations may be noted due to normal production tolerances. *

- The following four types of extension harness are required to measure the voltage.
  - 18P extension harness (J-6082-141-A)
    (VC-106 board CN101 ↔ CD-74 board CN901)
  - 20P extension harness (J-6082-133-A)
    (VS-87 board W607 ↔ CF block CN901)
  - 22P extension harness (J-6082-106-A)
    (VC-106 board CN302 ↔ TI-40 board CN801)
  - 32P extension harness (J-6082-142-A)
    (VC-106 board CN701 ↔ LD-51 board CN852)

Precautions for Replacement of CCD Imager Block.

- With a pair of IC901 (CCD imager) on the CD-74 complete board and IC001 (corrector ROM) on the DT-77 complete board, it is used a repair part of the CCD imager block. Since corrector ROM IC is manufactured to match the CCD imager, replacement of a single unit of the CCD imager corrector ROM cannot be allowed.
- When both a CCD imager and the corrector ROM, replace both the CCD imager and the corrector ROM, when a corrector ROM is not mounted on the service set, install a corrector ROM which is supplied anew.
- IC901 (CCD imager) is not mounted on the CD-74 complete board to be supplied as a repair part, and IC001 (corrector ROM) is not mounted on the DT-77 complete board to be supplied as a repair part. When the respective boards are replaced, remove the respective ICs from the old boards and install them to the new once respectively.
- After the CCD imager block has been replaced, perform the entire adjustments of the camera section.
- CCD imager is structurally in case of being broken down by static electricity.
  For this reason, take care to handle it as well as MOS IC. Moreover, care should be taken for dust not to be stuck on the light reseiving section and for strong light not to get into there.

VTR Recording Procedure for AEP, UK Model.

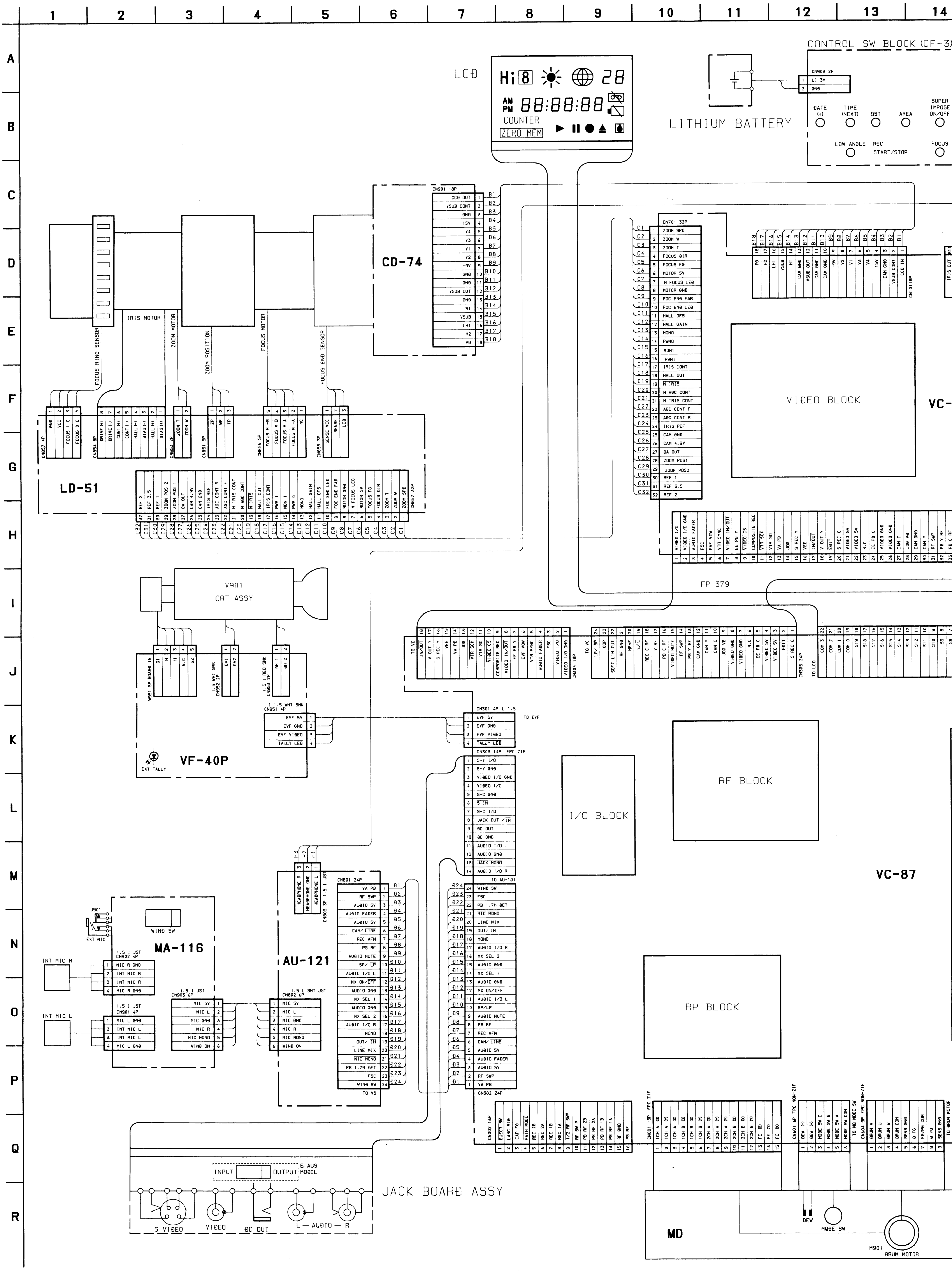
1. Insert the adjustment remote control RM-95 (J-6082-053-B) into the REMOTE jack.
2. Set the adjustment remote control to HOLD ON.
3. Select adjustment page 4, adjustment address C1 and adjustment data 41, and select adjustment page 4, adjustment address 29 and adjustment data 6☐ with the adjustment remote control. (When the power is turned OFF, the system will return to the original state.)
4. Select adjustment page 0, adjustment address 01 and adjustment data 01 with the adjustment remote control.
5. Select adjustment page D, adjustment address 05 and adjustment data 91 with the adjustment remote control.
6. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
7. Set the adjustment remote control to HOLD OFF.
   (Now, VTR recording can be started.)

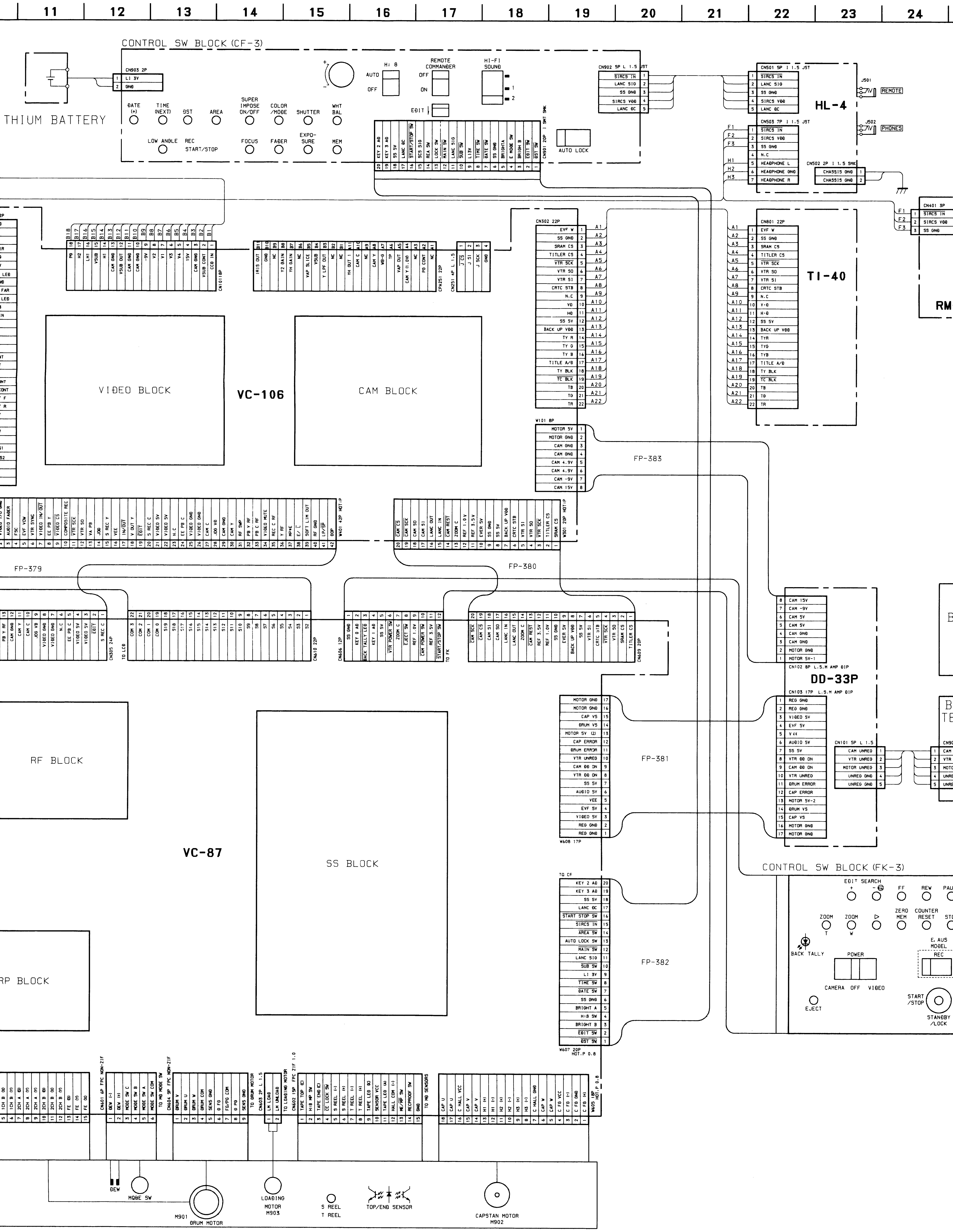
Note 1 : After recording has been done, be sure to turn the power OFF and then ON again to play back the record.

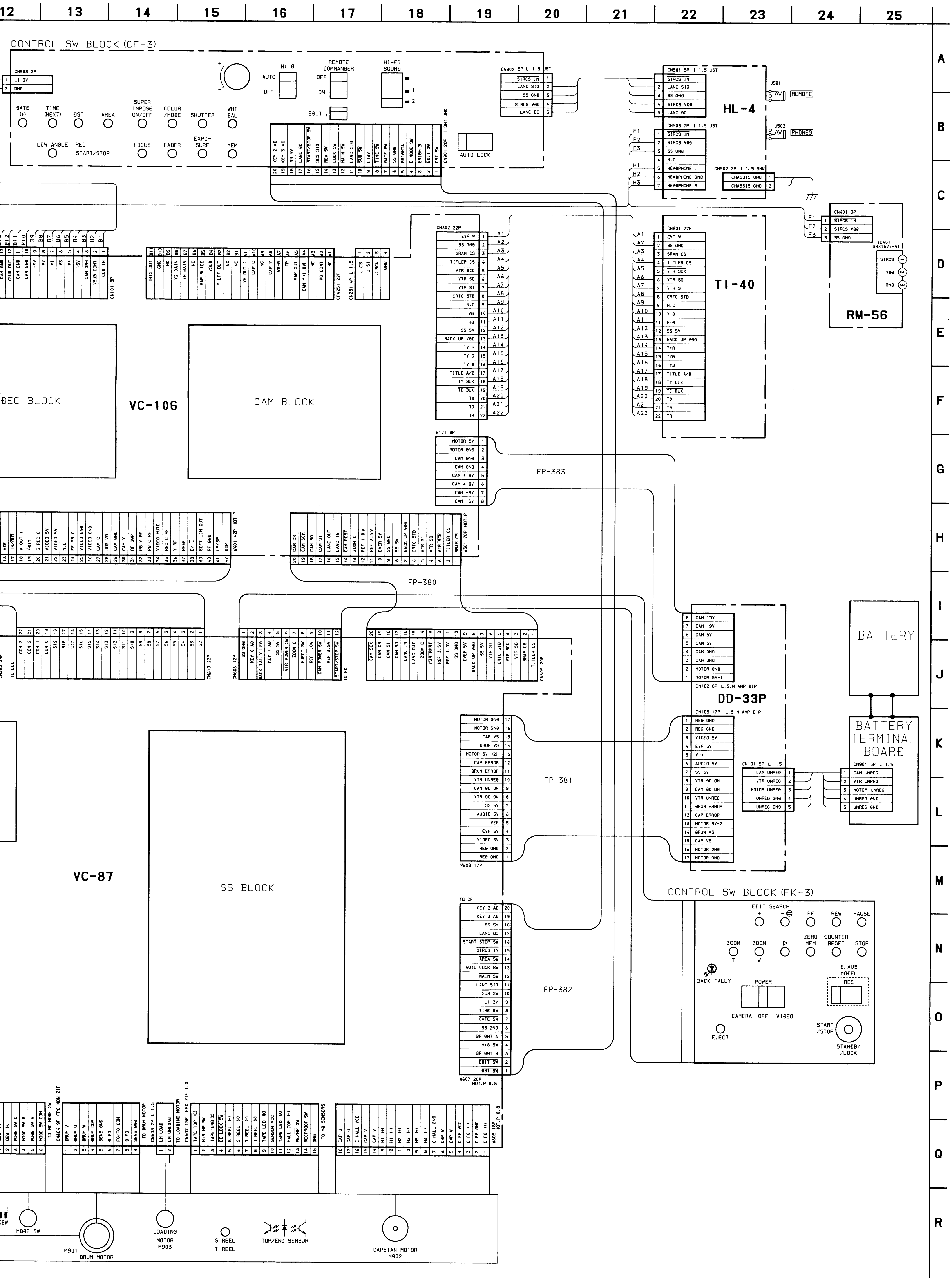
Note 2 : To clear REC mode, perform the above items 1, 2, 4, 5, 6 and 8. In this procedure, the adjustment data for item 6 should be set to 90.

Note 3 : When the data on page 4 has been changed, the SP/LP changeover and other switches will not be in force. Therefore, switch to a necessary mode before setting up necessary data.

4-1. FRAME SCHEMATIC DIAGRAM


1
2
3
4
5
6
7
8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
LCD
Hi8
28
AM PM 88:88:88
COUNTER
ZERO MEM
LITHIUM BATTERY
CONTROL SW BLOCK (CF-3
CN903 2P
LI 3V
GND
DATE (+)
TIME (NEXT)
DST
AREA
SUPER IMPOSE ON/OFF
LOW ANGLE
REC START/STOP
FOCUS
CD-74
CN901 18P
CCD OUT
VSUB CONT
GND
15V
V4
V3
V1
V2
-9V
GND
GND
VSUB OUT
GND
H1
VSUB
LH1
H2
PG
IRIS MOTOR
FOCUS RING SENSOR
ZOOM MOTOR
ZOOM POSITION
FOCUS MOTOR
FOCUS END SENSOR
CN857 4P
CN854 8P
CN853 2P
CN851 3P
CN856 5P
CN855 3P
CN852 32P
LD-51
CN701 32P
ZOOM SPD
ZOOM W
ZOOM T
FOCUS DIR
FOCUS FG
MOTOR 5V
M FOCUS LED
MOTOR GND
FOC END FAR
FOC END LED
HALL OFS
HALL GAIN
MONO
PWMO
MON1
PWM1
IRIS CONT
HALL OUT
M IRIS
M AGC CONT
M IRIS CONT
AGC CONT F
AGC CONT R
IRIS REF
CAM GND
CAM 4.9V
DA OUT
ZOOM POS1
ZOOM POS2
REF 1
REF 3.5
REF 2
CN1018P
VIDEO BLOCK
VC-
FP-379
V901
CRT ASSY
CN951 5P
CN952 2P
CN953 2P
VF-40P
EXT TALLY
CN951 4P
EVF 5V
EVF GND
EVF VIDEO
TALLY LED
CN301 4P L 1.5
TO EVF
CN304 18P
CN305 24P
TO VC
TO LCD
CN303 14P FPC ZIF
S-Y I/O
S-Y GND
VIDEO I/O GND
VIDEO I/O
S-C GND
S IN
S-C I/O
JACK OUT / IN
DC OUT
DC GND
AUDIO I/O L
AUDIO GND
JACK MONO
AUDIO I/O R
TO AU-101
I/O BLOCK
RF BLOCK
VC-87
RP BLOCK
CN803 3P
HEADPHONE R
HEADPHONE GND
HEADPHONE L
CN801 24P
AU-121
CN802 6P
TO VS
CN302 24P
J901
EXT MIC
WIND SW
MA-116
INT MIC R
INT MIC L
CN902 4P
CN901 4P
CN903 6P
MIC R GND
INT MIC R
MIC L GND
INT MIC L
MIC 5V
MIC L
MIC GND
MIC R
MIC MONO
WIND ON
CN002 16P
CN001 15P FPC ZIF
CN401 6P FPC NON-ZIF
CN604 9P FPC NON-ZIF
INPUT
OUTPUT
E, AUS MODEL
JACK BOARD ASSY
S VIDEO
VIDEO
DC OUT
L — AUDIO — R
MD
DEW
MODE SW
M901
DRUM MOTOR


11
12
13
14
15
16
17
18
19
20
21
22
23
24
CONTROL SW BLOCK (CF-3)
THIUM BATTERY
CN903 2P
L1 3V
GND
HI 8
AUTO
OFF
REMOTE COMMANDER
OFF
ON
HI-FI SOUND
EDIT
DATE (+)
TIME (NEXT)
DST
AREA
SUPER IMPOSE ON/OFF
COLOR /MODE
SHUTTER
WHT BAL
LOW ANGLE
REC START/STOP
FOCUS
FADER
EXPO-SURE
MEM
AUTO LOCK
CN902 5P L 1.5 JST
SIRCS IN
LANC SIG
SS GND
SIRCS VDD
LANC DC
HL-4
CN501 5P I 1.5 JST
CN503 7P I 1.5 JST
HEADPHONE L
HEADPHONE GND
HEADPHONE R
CN502 2P I 1.5 SMK
CHASSIS GND
J501
REMOTE
J502
PHONES
CN401 3P
RM
VIDEO BLOCK
VC-106
CAM BLOCK
CN302 22P
TI-40
CN801 22P
W101 8P
FP-383
FP-379
FP-380
CN1011 8P
CN251 4P L 1.5
W401 42P HOT.P
W501 20P HOT.P
CN305 24P
CN610 22P
CN606 12P
CN609 20P
DD-33P
CN102 8P L.S.M AMP DIP
CN103 17P L.S.M AMP DIP
CN101 5P L 1.5
RF BLOCK
VC-87
SS BLOCK
FP-381
W608 17P
RP BLOCK
FP-382
W607 20P HOT.P 0.8
CONTROL SW BLOCK (FK-3)
EDIT SEARCH
FF
REW
ZOOM T
ZOOM W
ZERO MEM
COUNTER RESET
BACK TALLY
POWER
CAMERA OFF VIDEO
EJECT
START /STOP
STANDBY /LOCK
E. AUS MODEL
REC
CN601 4P FPC NON-ZIF
CN604 9P FPC NON-ZIF
CN603 2P L 1.5
CN602 15P FPC ZIF 1.0
W605 18P HOT.P 0.8
DEW
MODE SW
M901
DRUM MOTOR
LOADING MOTOR M903
S REEL
T REEL
TOP/END SENSOR
CAPSTAN MOTOR M902


12
13
14
15
16
17
18
19
20
21
22
23
24
25
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
CONTROL SW BLOCK (CF-3)
CN903 2P
LI 3V
GND
DATE (+)
TIME (NEXT)
DST
AREA
SUPER IMPOSE ON/OFF
COLOR /MODE
SHUTTER
WHT BAL
LOW ANGLE
REC START/STOP
FOCUS
FADER
EXPO-SURE
MEM
Hi 8
AUTO
OFF
REMOTE COMMANDER
ON
HI-FI SOUND
EDIT
AUTO LOCK
CN901 20P 1 SMT SMK
CN902 5P L 1.5 JST
SIRCS IN
LANC SIG
SS GND
SIRCS VDD
LANC DC
CN501 5P 1 1.5 JST
HL-4
J501
REMOTE
J502
PHONES
CN503 7P 1 1.5 JST
HEADPHONE L
HEADPHONE GND
HEADPHONE R
CN502 2P 1 1.5 SMK
CHASSIS GND
CN401 3P
IC401 SBX1621-51
RM-56
CN302 22P
CN801 22P
TI-40
EVF W
SS GND
SRAM CS
TITLER CS
VTR SCK
VTR SO
VTR SI
CRTC STB
N.C
VD
HD
SS 5V
BACK UP VDD
TY R
TY G
TY B
TITLE A/D
TY BLK
TC BLK
TB
TG
TR
CN101 18P
CPA251 22P
CN251 4P L 1.5
DEO BLOCK
VC-106
CAM BLOCK
W101 8P
MOTOR 5V
MOTOR GND
CAM GND
CAM 4.9V
CAM -9V
CAM 15V
FP-383
W401 42P HOT:P
W301 20P HOT:P
FP-380
CN606 12P
CN609 20P
CN610 22P
TO LCD
TO FK
DD-33P
CN102 8P L.S.M AMP 01P
CN103 17P L.S.M AMP 01P
REG GND
VIDEO 5V
EVF 5V
V EE
AUDIO 5V
VTR DD ON
CAM DD ON
VTR UNREG
DRUM ERROR
CAP ERROR
MOTOR 5V-2
DRUM VS
CAP VS
BATTERY
BATTERY TERMINAL BOARD
CN101 5P L 1.5
CN901 5P L 1.5
CAM UNREG
UNREG GND
FP-381
W608 17P
VC-87
SS BLOCK
TO CF
FP-382
W607 20P HOT:P 0.8
CONTROL SW BLOCK (FK-3)
EDIT SEARCH
FF
REW
PAUSE
ZOOM T
ZOOM W
ZERO MEM
COUNTER RESET
STOP
BACK TALLY
POWER
CAMERA OFF VIDEO
E. AUS MODEL
REC
EJECT
START /STOP
STANDBY /LOCK
CN604 5P FPC NON-ZIF
CN603 2P L 1.5
CN602 15P FPC ZIF 1.0
TO MD SENSORS
W605 18P HOT:P 0.8
MODE SW
M901 DRUM MOTOR
LOADING MOTOR M903
S REEL
T REEL
TOP/END SENSOR
CAPSTAN MOTOR M902

4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

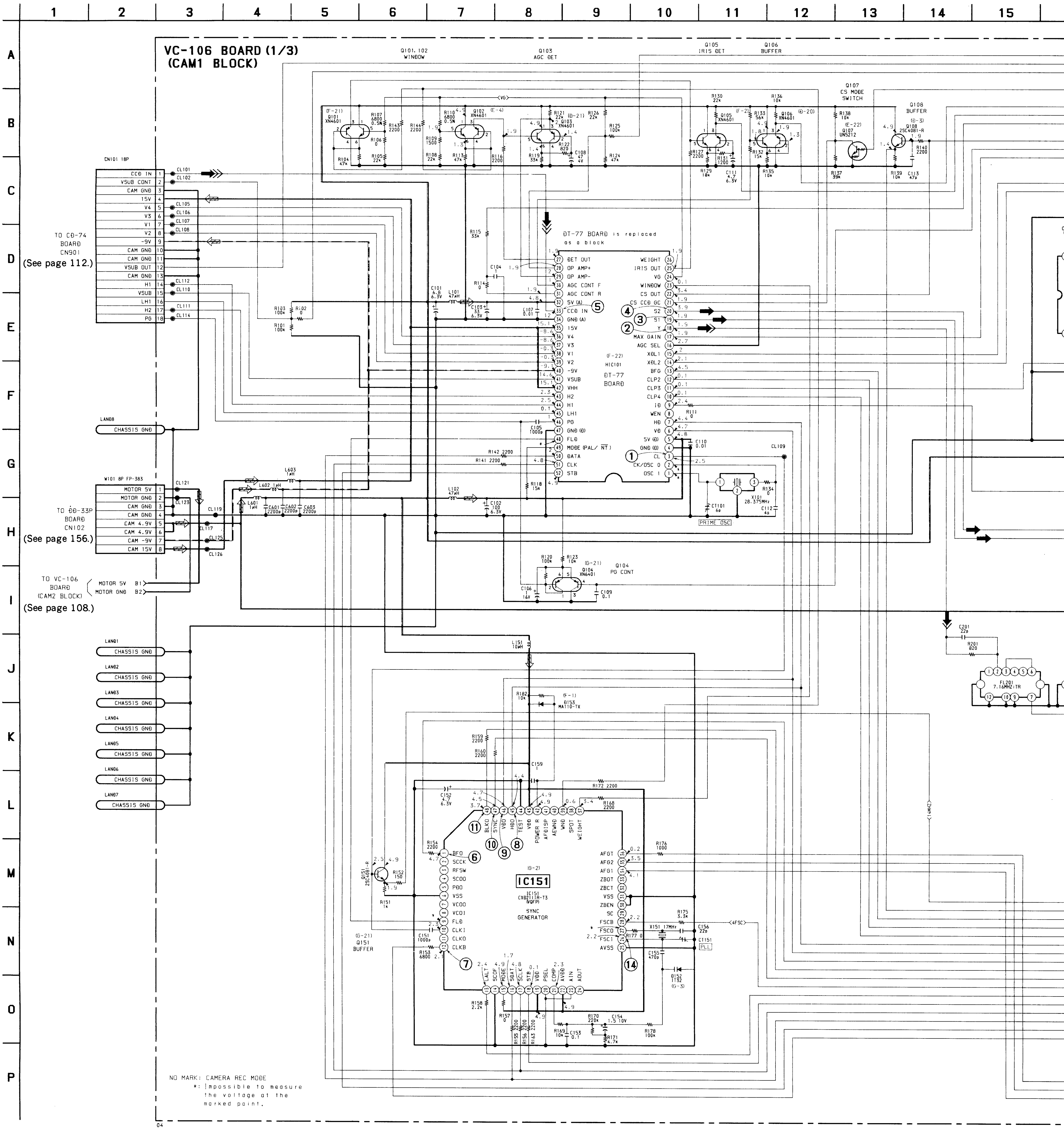
VC-106 (CAMERA) SCHEMATIC DIAGRAM

—Ref. No. VC-106 BOARD : 1000 series—

Be sure to always read "Precautions for replacement of CCD imager block" in page 88 when replacing the CD-74 board, complete, DT-77 board, complete and CCD imager block (IC901 on the CD-74 board and IC001 on the DT-77 board).

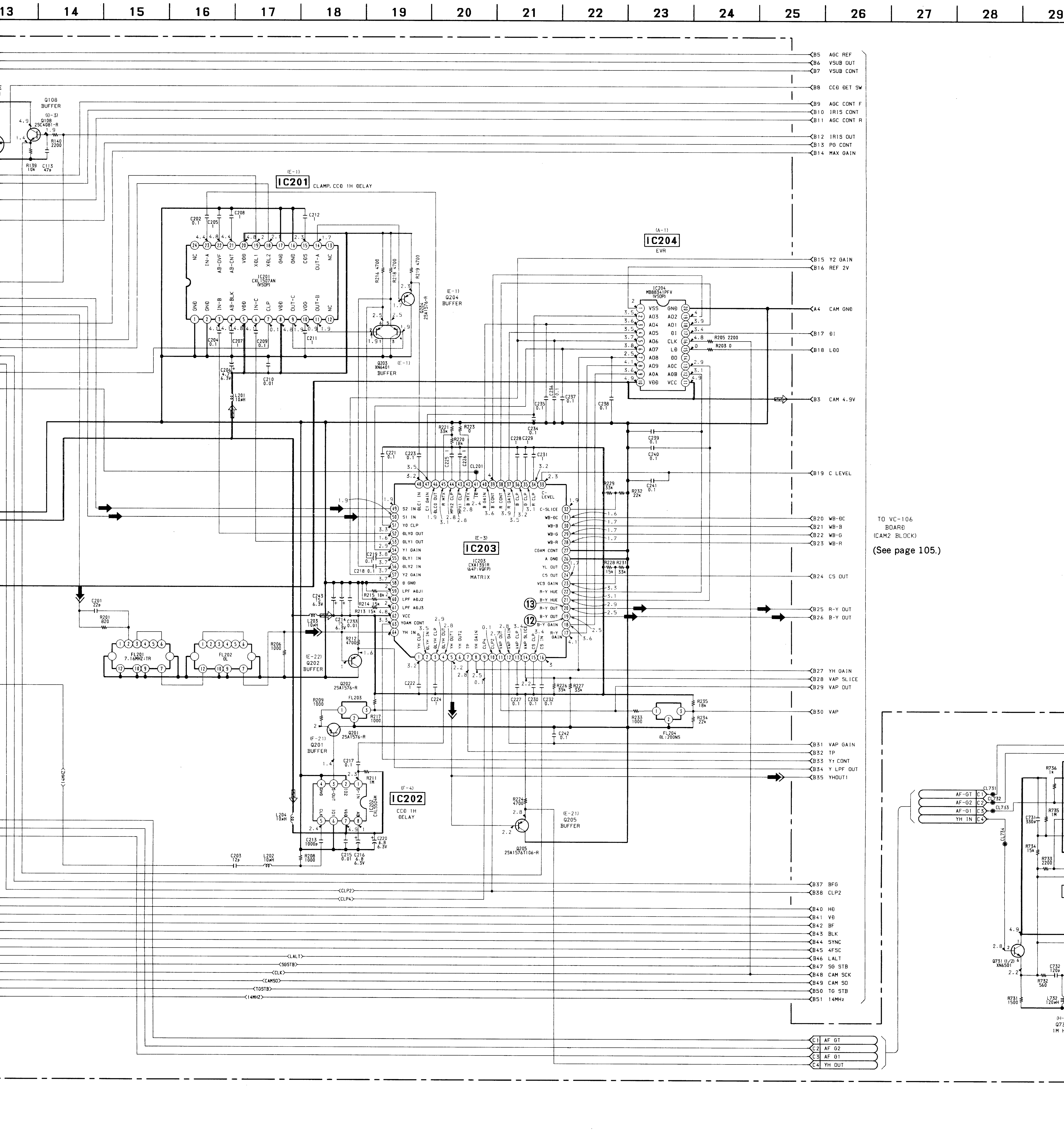
• Signal path

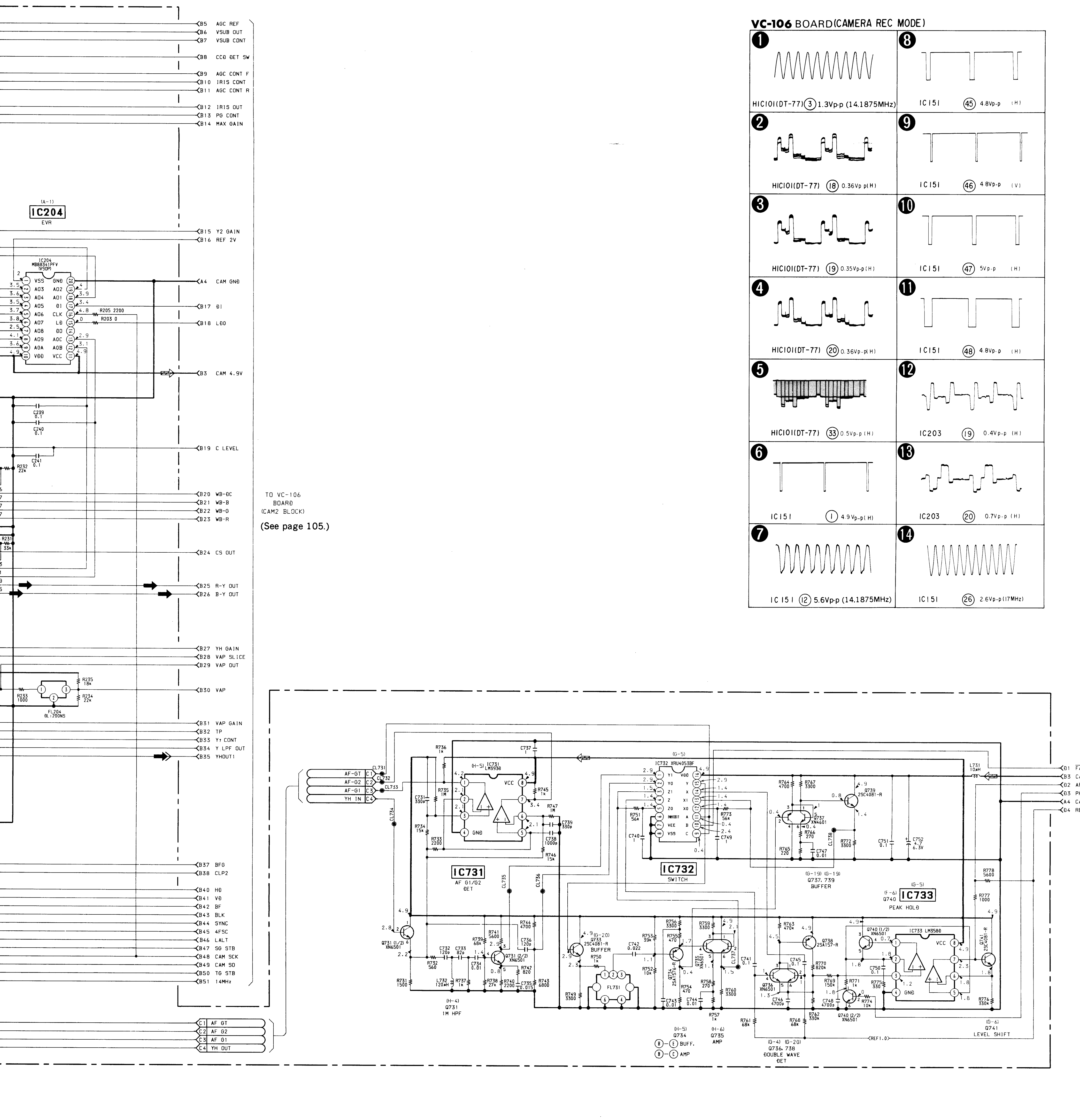
	VIDEO Signal		
	CHROMA	Y	Y/CHROMA
REC	➡	➡➡	➡➡➡
PB			


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
VC-106 BOARD (1/3)
(CAM1 BLOCK)
Q101, 102 WINDOW
Q103 AGC DET
Q105 IRIS DET
Q106 BUFFER
Q107 CS MODE SWITCH
Q108 BUFFER
CN101 18P
CCD IN
VSUB CONT
CAM GND
15V
V4
V3
V1
V2
-9V
CAM GND
CAM GND
VSUB OUT
CAM GND
H1
VSUB
LH1
H2
PG
TO CD-74 BOARD CN901
(See page 112.)
LAN08
CHASSIS GND
W101 8P FP-383
MOTOR 5V
MOTOR GND
CAM GND
CAM GND
CAM 4.9V
CAM 4.9V
CAM -9V
CAM 15V
TO DD-33P BOARD CN102
(See page 156.)
TO VC-106 BOARD (CAM2 BLOCK)
MOTOR 5V B1
MOTOR GND B2
(See page 108.)
LAN01
LAN02
LAN03
LAN04
LAN05
LAN06
LAN07
DT-77 BOARD is replaced as a block
DET OUT
OP AMP+
OP AMP-
AGC CONT F
AGC CONT R
5V (A)
CCD IN
GND (A)
15V
V4
V3
V1
V2
-9V
VSUB
VHH
H2
H1
LH1
PG
GND (D)
FLD
MODE (PAL/NT)
DATA
CLK
STB
WEIGHT
IRIS OUT
VG
WINDOW
CS OUT
CS CCD GC
S2
S1
Y
MAX GAIN
AGC SEL
XOL1
XOL2
BFG
CLP2
CLP3
CLP4
ID
WEN
HD
VD
5V (D)
GND (D)
CL
CK/OSC 0
OSC 1
(F-22) HIC101 DT-77 BOARD
X101 28.375MHz
PRIME OSC
Q104 PG CONT
L151 10μH
D153 MA110-TX
IC151 CXD2111R-T3 (QFP) SYNC GENERATOR
BFO
SCCK
RFSW
SCOO
PDO
VSS
VCOO
VCOI
FLD
CLKI
CLKO
CLKB
BLKO
SYNC
VBD
HBD
TEST
VDD
POWER R
AFDISP
AEWND
WND
SPOT
WEIGHT
AFGT
AFG2
AFG1
ZBOT
ZBCT
VSS
ZBEN
SC
FSCB
FSCO
FSCI
AVSS
LALT
SCDF
MODE
SDAT
SCLK
STB
VDD
PSEL
COMP
AVDD
AIN
AOUT
X151 17MHz
PLL
Q151 BUFFER
FL201 7.16MHz:TR
NO MARK: CAMERA REC MODE
*: Impossible to measure the voltage at the marked point.

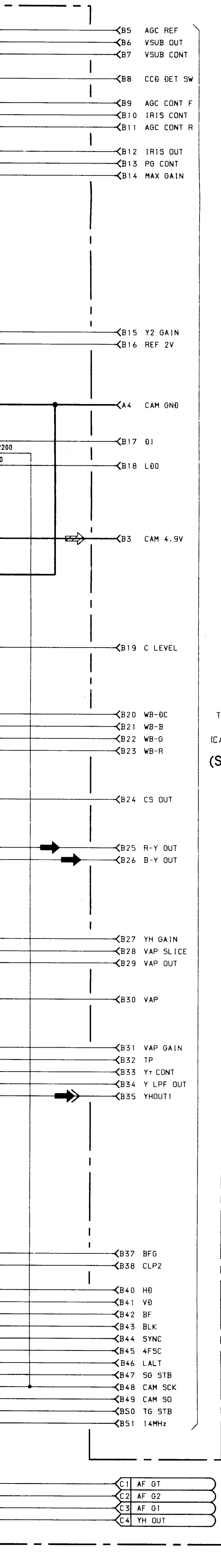
Signal path

	VIDEO Signal		
	CHROMA	Y	Y/CHROMA
REC	➡	⇛	⇛
PB			


13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
Q108 BUFFER
(D-3) Q108 2SC4081-R
R140 2200
R139 10k
C113 47p
(E-1) IC201 CLAMP, CCD 1H DELAY
IC201 CXL1507AN (VSOP)
NC
IN-A
AB-OVF
AB-CNT
VDD
XBL1
XBL2
GND
GND
CDS
OUT-A
NC
GND
GND
IN-B
AB-BLK
IN-C
CLP
VDD
OUT-C
VGG
OUT-B
C202 0.1
C205 1
C208 1
C212 1
C204 0.1
C207 1
C209 0.1
C211 1
C206 4.7 6.3V
C210 0.01
L201 10μH
R216 4700
R218 4700
R219 4700
(E-1) Q204 BUFFER
Q204 2SA1576-R
Q203 XN6401 (E-1) BUFFER
(A-1) IC204 EVR
IC204 MB88341PFV (VSOP)
VSS
AO3
AO4
AO5
AO6
AO7
AO8
AO9
AOA
VDD
GND
AO2
AO1
DI
CLK
LD
DO
AOC
AOB
VCC
R205 2200
R203 0
C235 0.1
C236 0.1
C237 0.1
C238 0.1
C234 0.1
R221 33k
R223 0
R220 18k
C228 C229
C231 1
C239 0.1
C240 0.1
C241 0.1
R229 33k
R232 22k
C221 0.1
C223 0.1
C225 1
C226 1
CL201
(E-3) IC203 MATRIX
IC203 CXA1391R (64P:VQFP)
S2 IN
S1 IN
YO CLP
DLYO OUT
DLY1 OUT
Y1 GAIN
DLY1 IN
DLY2 IN
Y2 GAIN
D GND
LPF ADJ1
LPF ADJ2
LPF ADJ3
VCC
YGAM CONT
YH IN
C-SLICE
WB-DC
WB-B
WB-G
WB-R
CGAM CONT
A GND
YL OUT
CS OUT
VCS GAIN
R-Y HUE
B-Y HUE
R-Y OUT
B-Y GAIN
B-Y OUT
R-Y GAIN
C LEVEL
C1 GAIN
DLCO OUT
R MTX
B MTX
B GAIN
R CONT
B CONT
R CLP
B CLP
R CLP
C218 0.1
C219
R215 18k
R214 15k
R213 15k
C243 15 6.3V
L203 10μH
C214 15 6.3V
C233 0.01
R212 4700
(E-22) Q202 BUFFER
Q202 2SA1576-R
C201 22p
R201 820
FL201 7.16MHz:TR
FL202 DL
R206 1000
R228 15k
R231 33k
C227 0.1
C230 0.1
C232 0.1
R226 39k
R227 33k
C222 1
C224 1
R209 1000
FL203
R217 1000
Q201 2SA1576-R
(F-21) Q201 BUFFER
R233 1000
FL204 DL:200NS
R235 18k
R234 22k
C242 0.1
C217 0.1
R211 1M
(F-4) IC202 CCD 1H DELAY
IC202 CXL5504M
L204 10μH
C213 1000p
R208 1000
C215 0.01
C216 6.8 6.3V
C220 6.8 6.3V
R224 4700
(E-21) Q205 BUFFER
Q205 2SA1576T106-R
C203 12p
L202 10μH
<14MHZ>
<CLP2>
<CLP4>
<LALT>
<SGSTB>
<CLK>
<CAMSO>
<TGSTB>
<14MHZ>
⑬
⑫
B5 AGC REF
B6 VSUB OUT
B7 VSUB CONT
B8 CCD DET SW
B9 AGC CONT F
B10 IRIS CONT
B11 AGC CONT R
B12 IRIS OUT
B13 PG CONT
B14 MAX GAIN
B15 Y2 GAIN
B16 REF 2V
A4 CAM GND
B17 DI
B18 LDD
B3 CAM 4.9V
B19 C LEVEL
B20 WB-DC
B21 WB-B
B22 WB-G
B23 WB-R
B24 CS OUT
B25 R-Y OUT
B26 B-Y OUT
B27 YH GAIN
B28 VAP SLICE
B29 VAP OUT
B30 VAP
B31 VAP GAIN
B32 TP
B33 Y7 CONT
B34 Y LPF OUT
B35 YHOUT1
B37 BFG
B38 CLP2
B40 HD
B41 VD
B42 BF
B43 BLK
B44 SYNC
B45 4FSC
B46 LALT
B47 SG STB
B48 CAM SCK
B49 CAM SO
B50 TG STB
B51 14MHz
C1 AF GT
C2 AF G2
C3 AF G1
C4 YH OUT
TO VC-106 BOARD (CAM2 BLOCK)
(See page 105.)
AF-GT
AF-G2
AF-G1
YH IN
CL731
CL732
CL733
CL734
R736 1k
R735 1M
C731 330p
R734 15k
R733 2200
Q731 (1/2) XN6501
C732 120p
R732 560
R731 1500
L732 120μH
Q73
1M

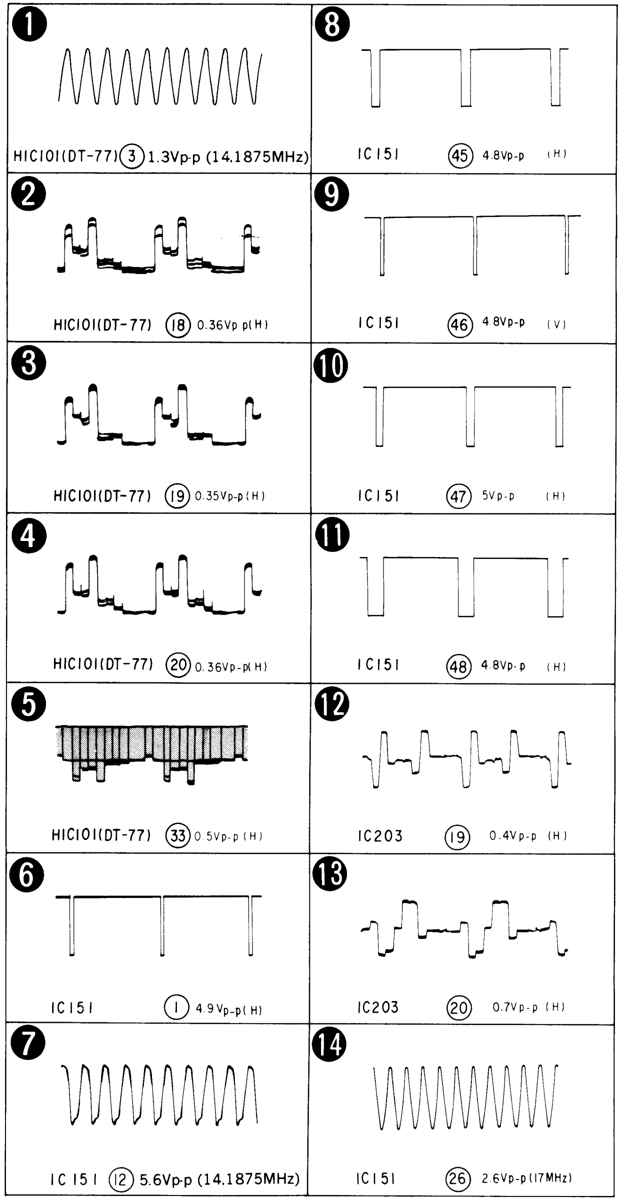

VC-106 BOARD(CAMERA REC MODE)
❶ HIC101(DT-77) ③ 1.3Vp-p (14.1875MHz)
❷ HIC101(DT-77) ⑱ 0.36Vp-p(H)
❸ HIC101(DT-77) ⑲ 0.35Vp-p(H)
❹ HIC101(DT-77) ⑳ 0.36Vp-p(H)
❺ HIC101(DT-77) ㉝ 0.5Vp-p(H)
❻ IC151 ① 4.9Vp-p(H)
❼ IC151 ⑫ 5.6Vp-p (14.1875MHz)
❽ IC151 ㊺ 4.8Vp-p (H)
❾ IC151 ㊻ 4.8Vp-p (V)
❿ IC151 ㊼ 5Vp-p (H)
⓫ IC151 ㊽ 4.8Vp-p (H)
⓬ IC203 ⑲ 0.4Vp-p (H)
⓭ IC203 ⑳ 0.7Vp-p (H)
⓮ IC151 ㉖ 2.6Vp-p(17MHz)
B5 AGC REF
B6 VSUB OUT
B7 VSUB CONT
B8 CCD DET SW
B9 AGC CONT F
B10 IRIS CONT
B11 AGC CONT R
B12 IRIS OUT
B13 PG CONT
B14 MAX GAIN
IC204
EVR
B15 Y2 GAIN
B16 REF 2V
A4 CAM GND
B17 DI
B18 LDD
B3 CAM 4.9V
B19 C LEVEL
B20 WB-DC
B21 WB-B
B22 WB-G
B23 WB-R
B24 CS OUT
B25 R-Y OUT
B26 B-Y OUT
B27 YH GAIN
B28 VAP SLICE
B29 VAP OUT
B30 VAP
FL204 BL-200NS
B31 VAP GAIN
B32 TP
B33 Y1 CONT
B34 Y LPF OUT
B35 YHOUT1
B37 BFG
B38 CLP2
B40 HD
B41 VD
B42 BF
B43 BLK
B44 SYNC
B45 4FSC
B46 LALT
B47 SG STB
B48 CAM SCK
B49 CAM SO
B50 TG STB
B51 14MHz
C1 AF GT
C2 AF G2
C3 AF G1
C4 YH OUT
TO VC-106 BOARD (CAM2 BLOCK)
(See page 105.)
IC731 AF G1/G2 DET
IC731 LM3930
IC732 SWITCH
IC732 XRU4053BF
IC733 PEAK HOLD
IC733 LM3580
Q731 1M HPF
Q733 2SC4081-R BUFFER
FL731
Q734 BUFF.
Q735 AMP
Q736, 738 DOUBLE WAVE DET
Q737, 739 BUFFER
Q740 PEAK HOLD
Q741 LEVEL SHIFT
REF1.0
D1
B3
D2
D3
A4
D4

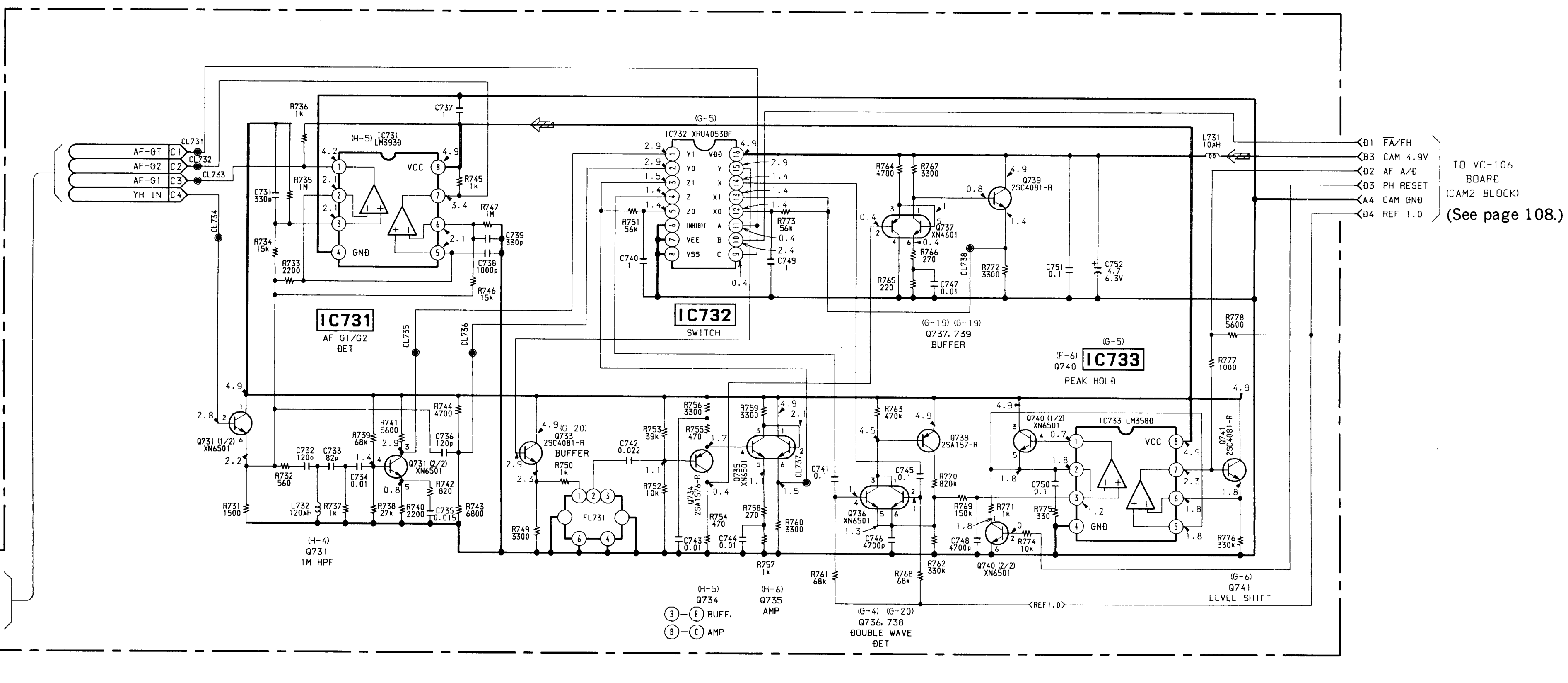
CAMERA (1) CAMERA (1)


B5 AGC REF
B6 VSUB OUT
B7 VSUB CONT
B8 CCD DET SW
B9 AGC CONT F
B10 IRIS CONT
B11 AGC CONT R
B12 IRIS OUT
B13 PG CONT
B14 MAX GAIN
B15 Y2 GAIN
B16 REF 2V
A4 CAM GND
B17 OI
B18 LOD
B3 CAM 4.9V
B19 C LEVEL
B20 WB-DC
B21 WB-B
B22 WB-G
B23 WB-R
B24 CS OUT
B25 R-Y OUT
B26 B-Y OUT
B27 YH GAIN
B28 VAP SLICE
B29 VAP OUT
B30 VAP
B31 VAP GAIN
B32 TP
B33 Y1 CONT
B34 Y LPF OUT
B35 YHOUT1
B37 BFG
B38 CLP2
B40 HD
B41 VD
B42 BF
B43 BLK
B44 SYNC
B45 4FSC
B46 LALT
B47 SG STB
B48 CAM SCK
B49 CAM SO
B50 TG STB
B51 14MHz
C1 AF GT
C2 AF G2
C3 AF G1
C4 YH OUT

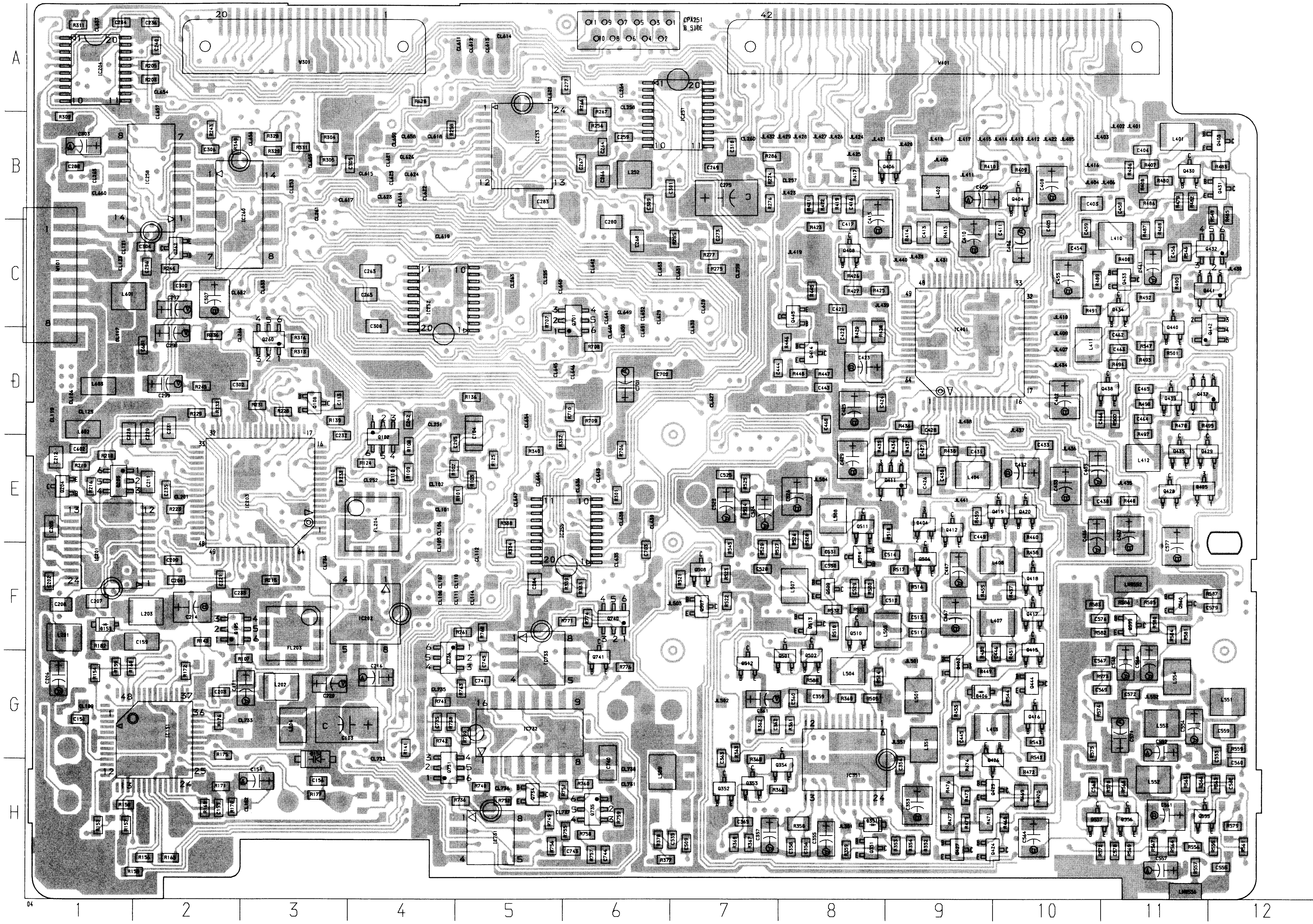
TO VC-106
BOARD
(CAM2 BLOCK)
(See page 105.)

VC-106 BOARD(CAMERA REC MODE)

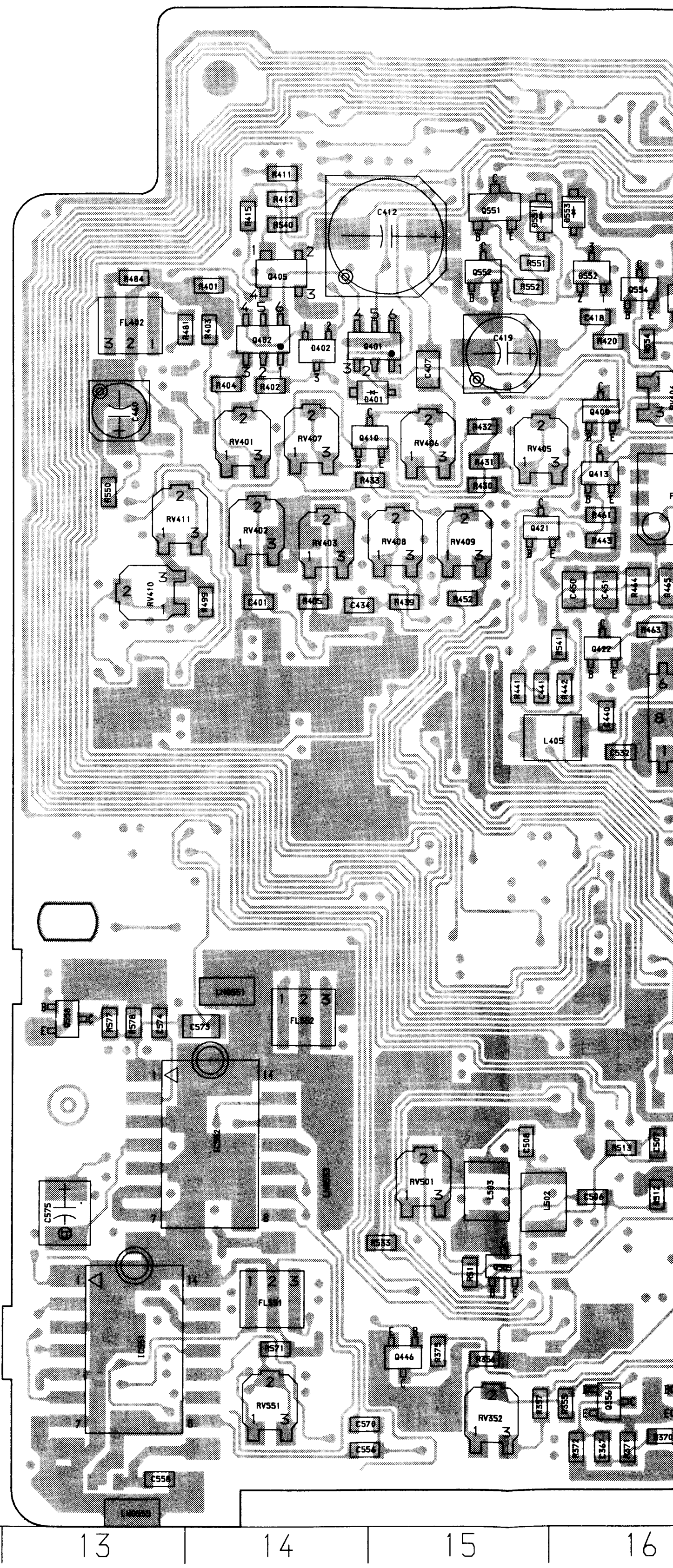



AF-GT C1
AF-G2 C2
AF-G1 C3
YH IN C4
IC731
AF G1/G2 DET
IC731 LM393D
IC732
SWITCH
IC732 XRU4053BF
IC733
PEAK HOLD
IC733 LM358D
Q731 IM HPF
Q733 BUFFER
Q734 BUFF.
Q735 AMP
Q736, 738 DOUBLE WAVE DET
Q737, 739 BUFFER
Q740
Q741 LEVEL SHIFT
FL731
D1 FA/FH
B3 CAM 4.9V
D2 AF A/D
D3 PH RESET
A4 CAM GND
D4 REF 1.0
TO VC-106 BOARD (CAM2 BLOCK)
(See page 108.)

VC-106 BOARD (CONDUCTOR SIDE)


A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
8
9
10
11
12
CPA251
B SIDE

VC-106 BOARD (COMPONENT SIDE



< DIODE >

D152	8-719-949-46	1T32
D153	8-719-404-46	MA110
D251	8-719-404-46	MA110
D253	8-719-404-46	MA110
D254	8-719-404-46	MA110
D351	8-719-404-46	MA110
D401	8-719-421-03	MA732
D402	8-719-404-35	MA141WK
D403	8-719-820-05	1SS181
D404	8-719-820-05	1SS181
D405	8-719-404-35	MA141WK
D406	8-719-404-46	MA110
D551	8-719-404-46	MA110
D552	8-719-404-35	MA141WK
D553	8-719-404-46	MA110

< HIC >

HIC101	A-7068-194-A DT-77 BOARD, COMPLETE

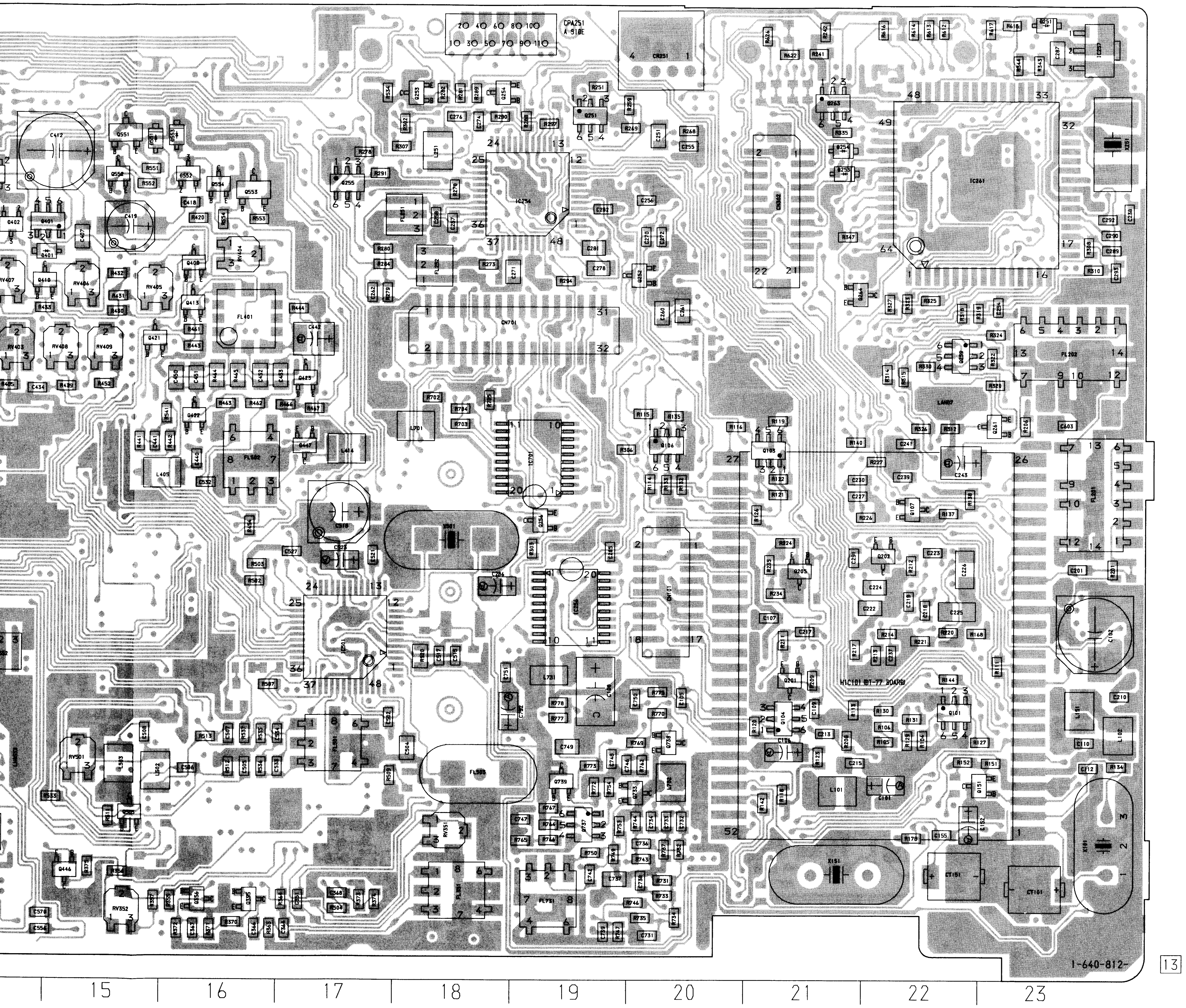
< IC >

IC151	8-752-339-77	CXD2111R-T3
IC201	8-752-340-34	CXL1507AN
IC202	8-752-332-69	CXL5504M
IC203	8-752-038-97	CXA1391R
IC204	8-759-946-00	MB88341PFV
IC251	8-759-946-00	MB88341PFV
IC252	8-752-056-04	CXA1609N
IC253	8-752-039-49	CXA1393AN
IC254	8-752-057-59	CXA1592R
IC255	8-759-521-09	MB88346APFV
IC256	8-759-512-59	MB88352PFV
IC257	8-759-937-56	S-8054ALB-LM-S
IC258	8-759-008-67	MC14066BF
IC260	8-759-998-96	LM324D
IC261	8-759-044-05	MC68HC11L6FUSC400607
IC351	8-759-605-61	CXA1203N
IC401	8-752-036-19	CXA1207AR
IC501	8-752-036-20	CXA1208R
IC551	8-752-333-24	CXL1506M
IC552	8-752-333-24	CXL1506M
IC701	8-752-348-74	CXD2104AN
IC731	8-759-998-92	LM393D
IC732	8-759-509-17	XRU4053BF
IC733	8-759-998-98	LM358D

< TRANSISTOR >

Q101	8-729-907-46	IMZ1
Q102	8-729-907-46	IMZ1
Q103	8-729-907-46	IMZ1
Q104	8-729-925-42	IMT2
Q105	8-729-907-46	IMZ1
Q106	8-729-907-46	IMZ1
Q107	8-729-402-45	UN5212
Q108	8-729-905-35	2SC4081-R
Q151	8-729-905-35	2SC4081-R
Q201	8-729-905-23	2SA1576-R
Q202	8-729-905-23	2SA1576-R
Q203	8-729-925-42	IMT2
Q204	8-729-905-23	2SA1576-R
Q205	8-729-905-23	2SA1576-R
Q251	8-729-907-46	IMZ1
Q252	8-729-905-18	DTC144EU
Q253	8-729-905-23	2SA1576-R
Q254	8-729-905-35	2SC4081-R
Q255	8-729-907-46	IMZ1
Q256	8-729-905-23	2SA1576-R
Q259	8-729-925-39	IMH8
Q260	8-729-925-42	IMT2
Q261	8-729-420-50	UN5215
Q262	8-729-905-35	2SC4081-R
Q263	8-729-925-39	IMH8
Q264	8-729-420-50	UN5215
Q351	8-729-905-12	DTA144EU
Q352	8-729-905-18	DTC144EU
Q353	8-729-905-35	2SC4081-R
Q354	8-729-905-35	2SC4081-R
Q355	8-729-905-35	2SC4081-R
Q356	8-729-905-18	DTC144EU
Q401	8-729-920-48	IMH2
Q402	8-729-907-39	IMD2
Q403	8-729-905-23	2SA1576-R
Q404	8-729-905-18	DTC144EU
Q405	8-729-824-05	3SK248
Q406	8-729-905-18	DTC144EU
Q408	8-729-905-12	DTA144EU
Q409	8-729-824-02	2SA1838-TL
Q410	8-729-905-12	DTA144EU
Q411	8-729-403-06	XN1113
Q412	8-729-905-18	DTC144EU
Q413	8-729-905-18	DTC144EU
Q414	8-729-423-52	2SC3931
Q415	8-729-824-02	2SA1838
Q416	8-729-905-18	DTC144EU
Q417	8-729-905-35	2SC4081-R
Q418	8-729-905-23	2SA1576-R
Q419	8-729-905-23	2SA1576-R
Q420	8-729-905-35	2SC4081-R
Q421	8-729-905-18	DTC144EU
Q422	8-729-823-16	2SC4555-5. 6. 7
Q423	8-729-823-16	2SC4555-5. 6. 7
Q424	8-729-905-18	DTC144EU
Q425	8-729-905-18	DTC144EU
Q426	8-729-905-12	DTA144EU
Q427	8-729-905-18	DTC144EU
Q428	8-729-905-18	DTC144EU
Q429	8-729-905-18	DTC144EU
Q430	8-729-423-52	2SC3931
Q431	8-729-423-52	2SC3931
Q432	8-729-907-26	IMX1
Q433	8-729-905-35	2SC4081-R
Q434	8-729-905-35	2SC4081-R
Q435	8-729-905-12	DTA144EU
Q437	8-729-403-06	XN1113
Q438	8-729-423-52	2SC3931
Q439	8-729-920-99	DTA114EU
Q440	8-729-905-23	2SA1576-R
Q441	8-729-403-06	XN1113
Q442	8-729-403-07	XN1213
Q443	8-729-905-18	DTC144EU
Q444	8-729-905-18	DTC144EU
Q446	8-729-905-18	DTC144EU
Q447	8-729-905-18	DTC144EU
Q501	8-729-905-35	2SC4081-R
Q502	8-729-905-35	2SC4081-R
Q505	8-729-905-23	2SA1576-R
Q506	8-729-905-35	2SC4081-R
Q507	8-729-905-35	2SC4081-R
Q508	8-729-905-35	2SC4081-R
Q509	8-729-905-12	DTA144EU
Q510	8-729-423-52	2SC3931
Q511	8-729-905-18	DTC144EU
Q512	8-729-905-35	2SC4081-R
Q513	8-729-905-18	DTC144EU
Q514	8-729-905-18	DTC144EU
Q551	8-729-807-87	2SB1295-UL6
Q552	8-729-905-18	DTC144EU
Q553	8-729-807-87	2SB1295-UL6
Q554	8-729-905-18	DTC144EU
Q555	8-729-905-23	2SA1576-R
Q556	8-729-905-35	2SC4081-R
Q557	8-729-905-35	2SC4081-R
Q558	8-729-905-18	DTC144EU
Q559	8-729-905-23	2SA1576-R
Q560	8-729-905-35	2SC4081-R
Q701	8-729-907-46	IMZ1
Q731	8-729-920-59	IMX2
Q733	8-729-905-35	2SC4081-R
Q734	8-729-905-23	2SA1576-R
Q735	8-729-920-59	IMX2
Q736	8-729-920-59	IMX2
Q737	8-729-907-46	IMZ1
Q738	8-729-905-23	2SA1576-R
Q739	8-729-905-35	2SC4081-R
Q740	8-729-920-59	IMX2
Q741	8-729-905-35	2SC4081-R

BOARÐ (COMPONENT SIÐE)



< DIODE >

D152	8-719-949-46	1T32
D153	8-719-404-46	MA110
D251	8-719-404-46	MA110
D253	8-719-404-46	MA110
D254	8-719-404-46	MA110
D351	8-719-404-46	MA110
D401	8-719-421-03	MA732
D402	8-719-404-35	MA141WK
D403	8-719-820-05	1SS181
D404	8-719-820-05	1SS181
D405	8-719-404-35	MA141WK
D406	8-719-404-46	MA110
D551	8-719-404-46	MA110
D552	8-719-404-35	MA141WK
D553	8-719-404-46	MA110

< HIC >

HIC101	A-7068-194-A	DT-77 BOARD, COMPLETE

< IC >

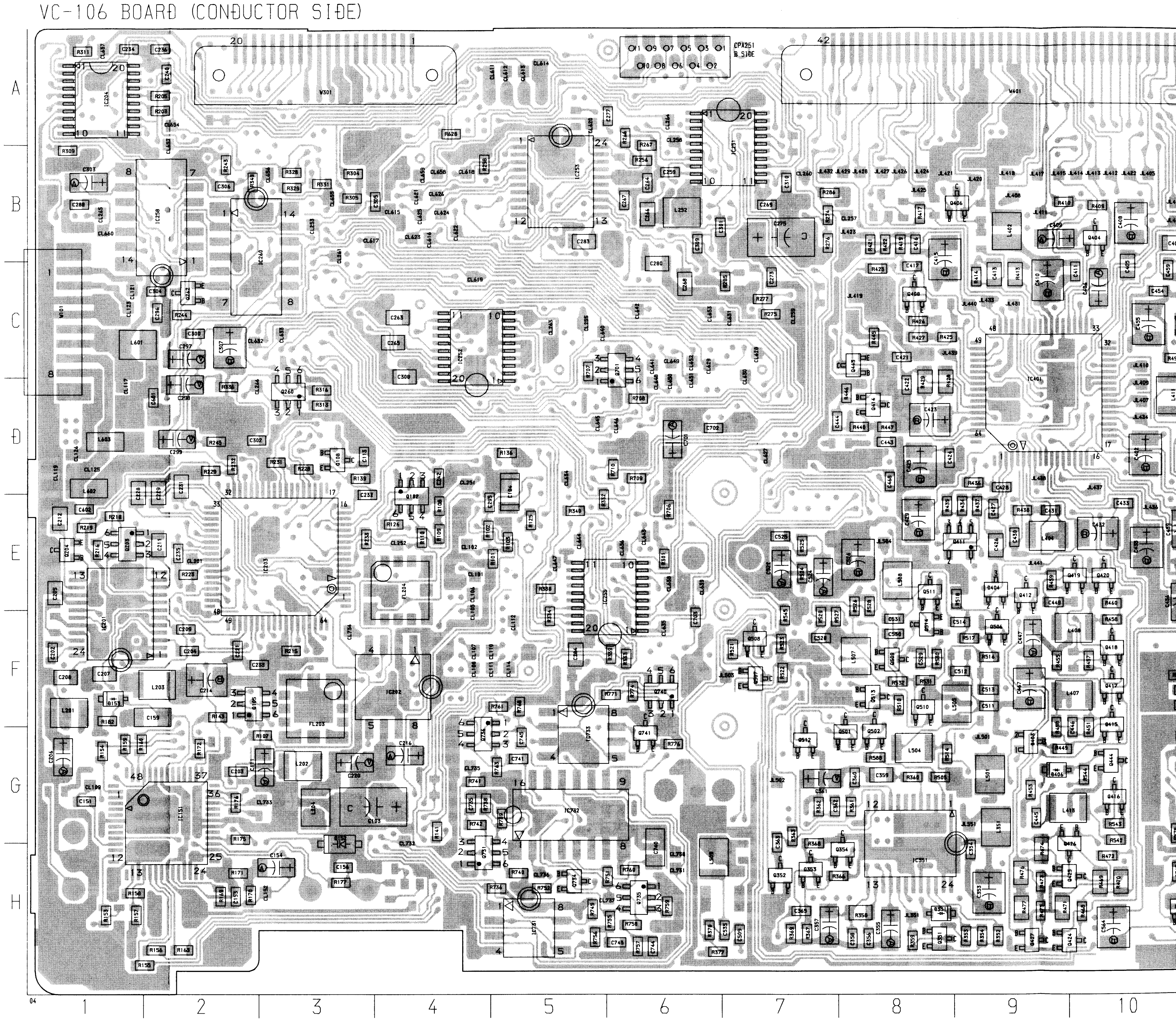
IC151	8-752-339-77	CXD2111R-T3
IC201	8-752-340-34	CXL1507AN
IC202	8-752-332-69	CXL5504M
IC203	8-752-038-97	CXA1391R
IC204	8-759-946-00	MB88341PFV
IC251	8-759-946-00	MB88341PFV
IC252	8-752-056-04	CXA1609N
IC253	8-752-039-49	CXA1393AN
IC254	8-752-057-59	CXA1592R
IC255	8-759-521-09	MB88346APFV
IC256	8-759-512-59	MB88352PFV
IC257	8-759-937-56	S-8054ALB-LM-S
IC258	8-759-008-67	MC14066BF
IC260	8-759-998-96	LM324D
IC261	8-759-044-05	MC68HC11L6FUSC400607
IC351	8-759-605-61	CXA1203N
IC401	8-752-036-19	CXA1207AR
IC501	8-752-036-20	CXA1208R
IC551	8-752-333-24	CXL1506M
IC552	8-752-333-24	CXL1506M
IC701	8-752-348-74	CXD2104AN
IC731	8-759-998-92	LM393D
IC732	8-759-509-17	XRU4053BF
IC733	8-759-998-98	LM358D

< TRANSISTOR >

Q101	8-729-907-46	IMZ1
Q102	8-729-907-46	IMZ1
Q103	8-729-907-46	IMZ1
Q104	8-729-925-42	IMT2
Q105	8-729-907-46	IMZ1
Q106	8-729-907-46	IMZ1
Q107	8-729-402-45	UN5212
Q108	8-729-905-35	2SC4081-R
Q151	8-729-905-35	2SC4081-R
Q201	8-729-905-23	2SA1576-R
Q202	8-729-905-23	2SA1576-R
Q203	8-729-925-42	IMT2
Q204	8-729-905-23	2SA1576-R
Q205	8-729-905-23	2SA1576-R
Q251	8-729-907-46	IMZ1
Q252	8-729-905-18	DTC144EU
Q253	8-729-905-23	2SA1576-R
Q254	8-729-905-35	2SC4081-R
Q255	8-729-907-46	IMZ1
Q256	8-729-905-23	2SA1576-R
Q259	8-729-925-39	IMH8
Q260	8-729-925-42	IMT2
Q261	8-729-420-50	UN5215
Q262	8-729-905-35	2SC4081-R
Q263	8-729-925-39	IMH8
Q264	8-729-420-50	UN5215
Q351	8-729-905-12	DTA144EU
Q352	8-729-905-18	DTC144EU
Q353	8-729-905-35	2SC4081-R
Q354	8-729-905-35	2SC4081-R
Q355	8-729-905-35	2SC4081-R
Q356	8-729-905-18	DTC144EU
Q401	8-729-920-48	IMH2
Q402	8-729-907-39	IMD2
Q403	8-729-905-23	2SA1576-R
Q404	8-729-905-18	DTC144EU
Q405	8-729-824-05	3SK248
Q406	8-729-905-18	DTC144EU
Q408	8-729-905-12	DTA144EU
Q409	8-729-824-02	2SA1838-TL
Q410	8-729-905-12	DTA144EU
Q411	8-729-403-06	XN1113
Q412	8-729-905-18	DTC144EU
Q413	8-729-905-18	DTC144EU
Q414	8-729-423-52	2SC3931
Q415	8-729-824-02	2SA1838
Q416	8-729-905-18	DTC144EU
Q417	8-729-905-35	2SC4081-R
Q418	8-729-905-23	2SA1576-R
Q419	8-729-905-23	2SA1576-R
Q420	8-729-905-35	2SC4081-R
Q421	8-729-905-18	DTC144EU
Q422	8-729-823-16	2SC4555-5. 6. 7
Q423	8-729-823-16	2SC4555-5. 6. 7
Q424	8-729-905-18	DTC144EU
Q425	8-729-905-18	DTC144EU
Q426	8-729-905-12	DTA144EU
Q427	8-729-905-18	DTC144EU
Q428	8-729-905-18	DTC144EU
Q429	8-729-905-18	DTC144EU
Q430	8-729-423-52	2SC3931
Q431	8-729-423-52	2SC3931
Q432	8-729-907-26	IMX1
Q433	8-729-905-35	2SC4081-R
Q434	8-729-905-35	2SC4081-R
Q435	8-729-905-12	DTA144EU
Q437	8-729-403-06	XN1113
Q438	8-729-423-52	2SC3931
Q439	8-729-920-99	DTA114EU
Q440	8-729-905-23	2SA1576-R
Q441	8-729-403-06	XN1113
Q442	8-729-403-07	XN1213
Q443	8-729-905-18	DTC144EU
Q444	8-729-905-18	DTC144EU
Q446	8-729-905-18	DTC144EU
Q447	8-729-905-18	DTC144EU
Q501	8-729-905-35	2SC4081-R
Q502	8-729-905-35	2SC4081-R
Q505	8-729-905-23	2SA1576-R
Q506	8-729-905-35	2SC4081-R
Q507	8-729-905-35	2SC4081-R
Q508	8-729-905-35	2SC4081-R
Q509	8-729-905-12	DTA144EU
Q510	8-729-423-52	2SC3931
Q511	8-729-905-18	DTC144EU
Q512	8-729-905-35	2SC4081-R
Q513	8-729-905-18	DTC144EU
Q514	8-729-905-18	DTC144EU
Q551	8-729-807-87	2SB1295-UL6
Q552	8-729-905-18	DTC144EU
Q553	8-729-807-87	2SB1295-UL6
Q554	8-729-905-18	DTC144EU
Q555	8-729-905-23	2SA1576-R
Q556	8-729-905-35	2SC4081-R
Q557	8-729-905-35	2SC4081-R
Q558	8-729-905-18	DTC144EU
Q559	8-729-905-23	2SA1576-R
Q560	8-729-905-35	2SC4081-R
Q701	8-729-907-46	IMZ1
Q731	8-729-920-59	IMX2
Q733	8-729-905-35	2SC4081-R
Q734	8-729-905-23	2SA1576-R
Q735	8-729-920-59	IMX2
Q736	8-729-920-59	IMX2
Q737	8-729-907-46	IMZ1
Q738	8-729-905-23	2SA1576-R
Q739	8-729-905-35	2SC4081-R
Q740	8-729-920-59	IMX2
Q741	8-729-905-35	2SC4081-R

VC-106 (CAMERA) PRINTED WIRING BOARD

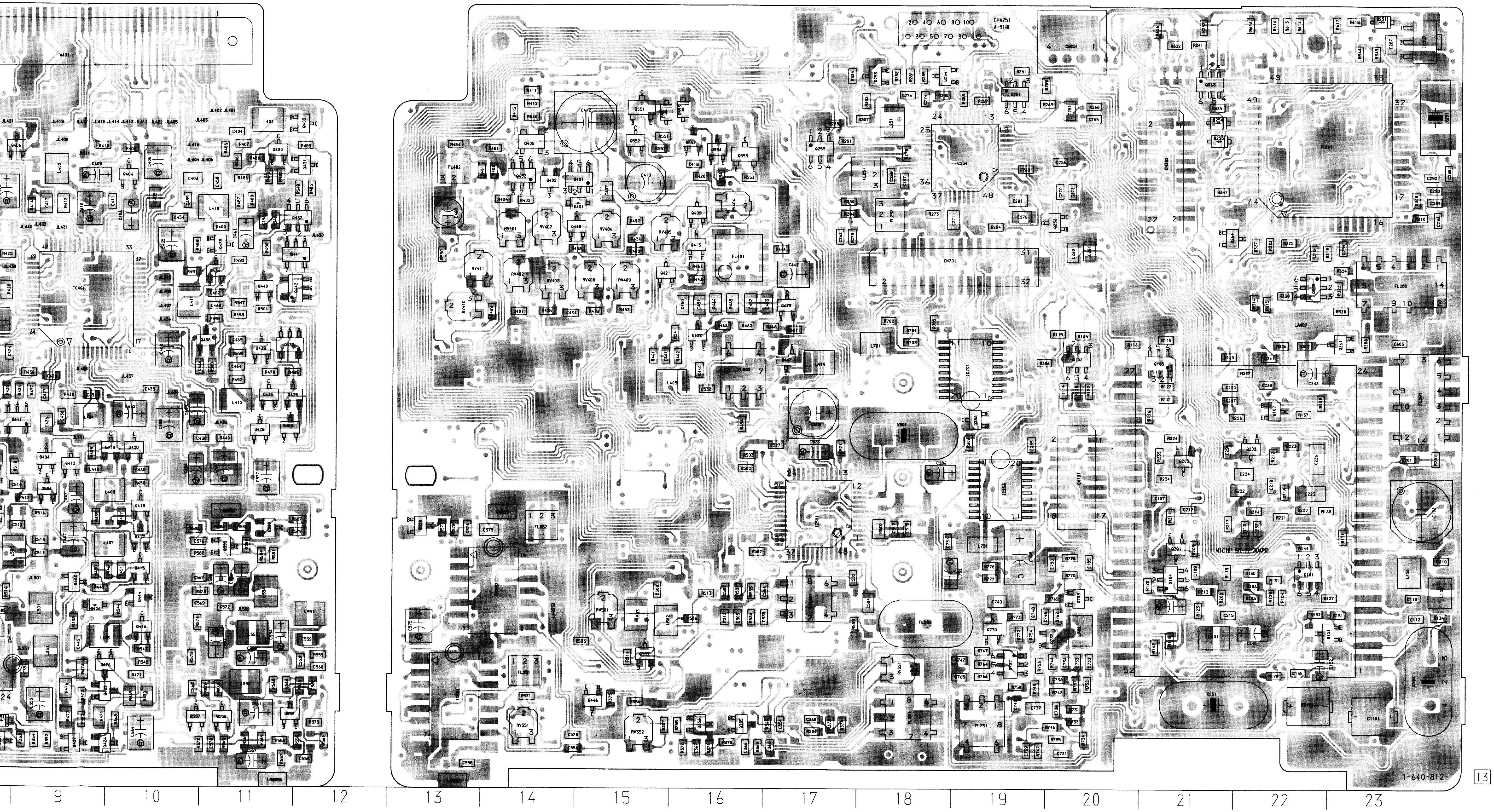
—Ref. No. VC-106 BOARD : 1000 series—



CAMERA (2) **CAMERA (2)**

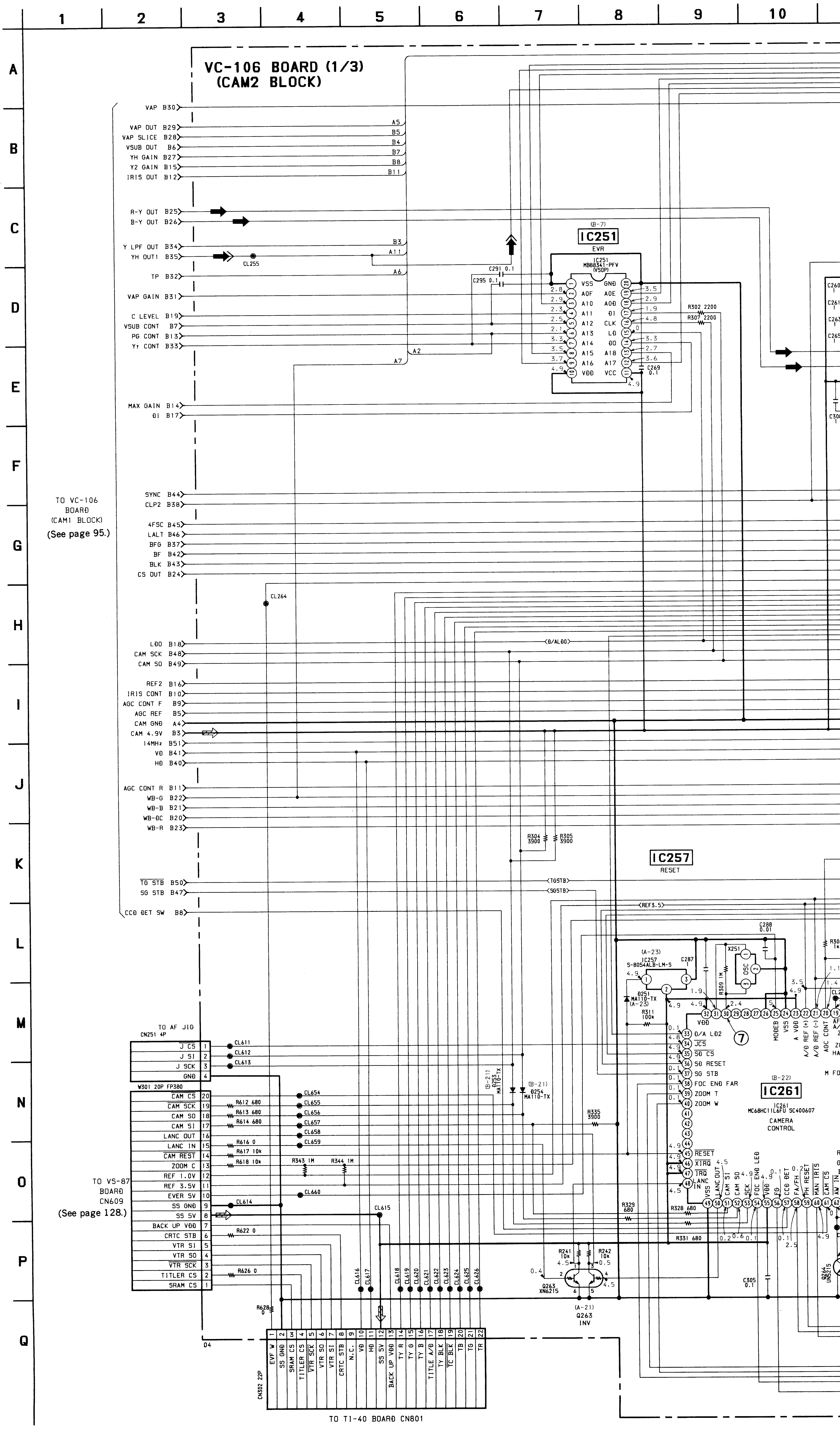
-905-35 2SC4081-R
-920-59 IMX2
-905-35 2SC4081-R

VC-106 BOARD (COMPONENT SIDE)

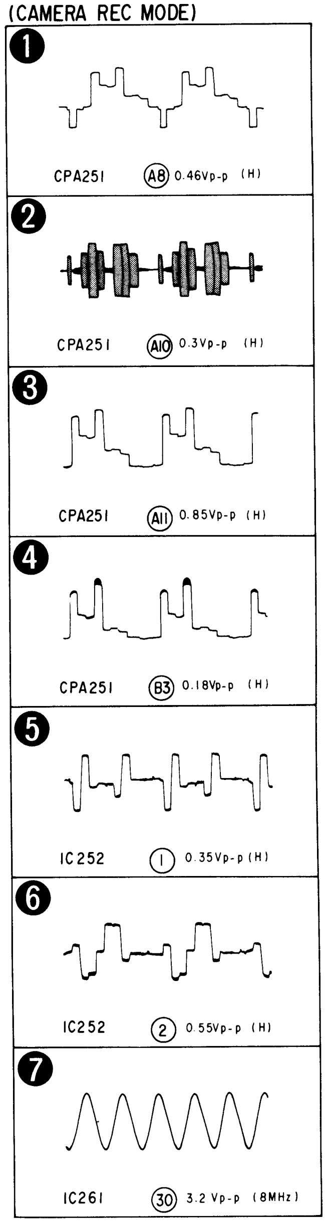

1-640-812-
13
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

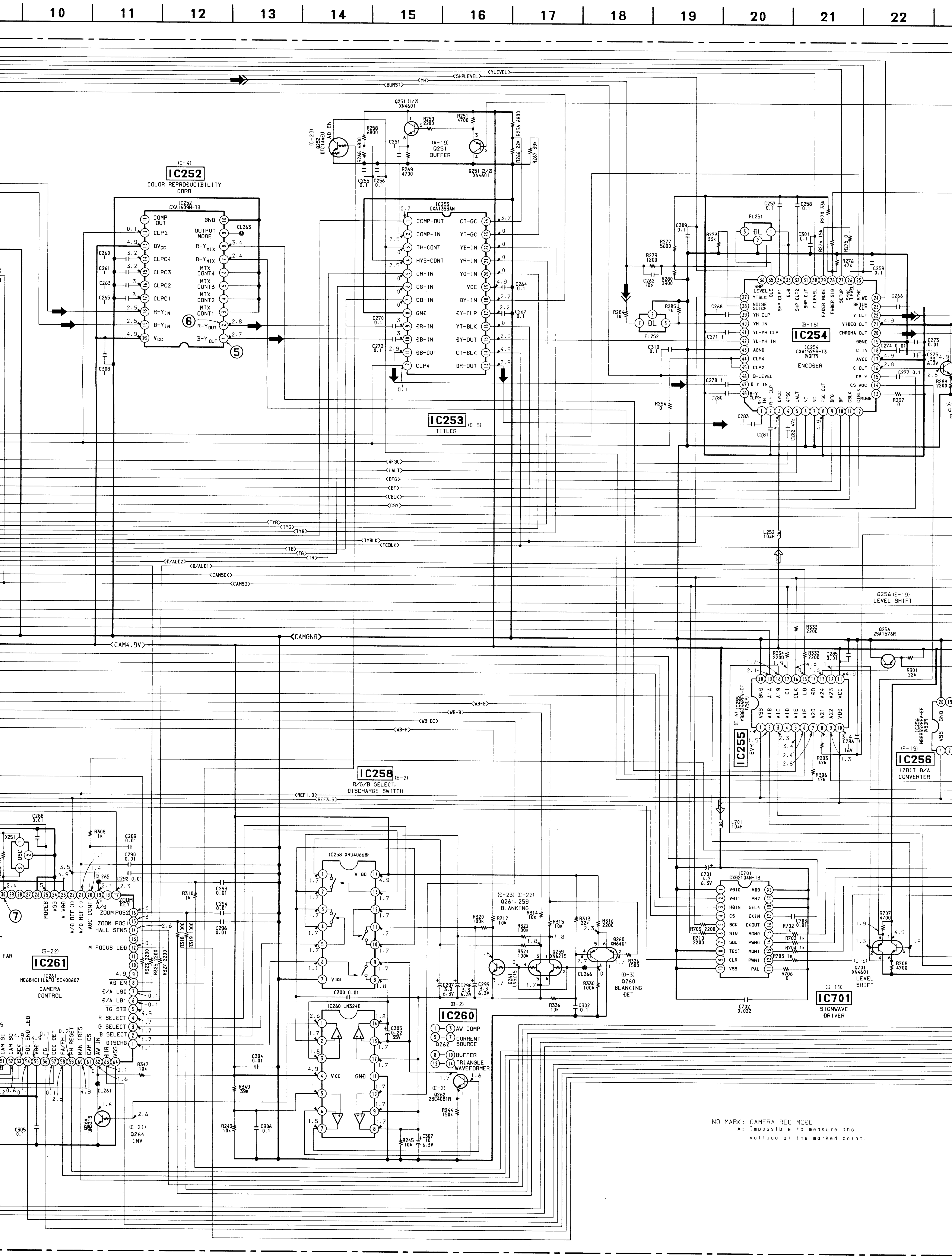
CAMERA (2) **CAMERA (2)**

VC-106 (CAMERA) SCHEMATIC DIAGRAM
—Ref. No. VC-106 BOARD : 1000 series—

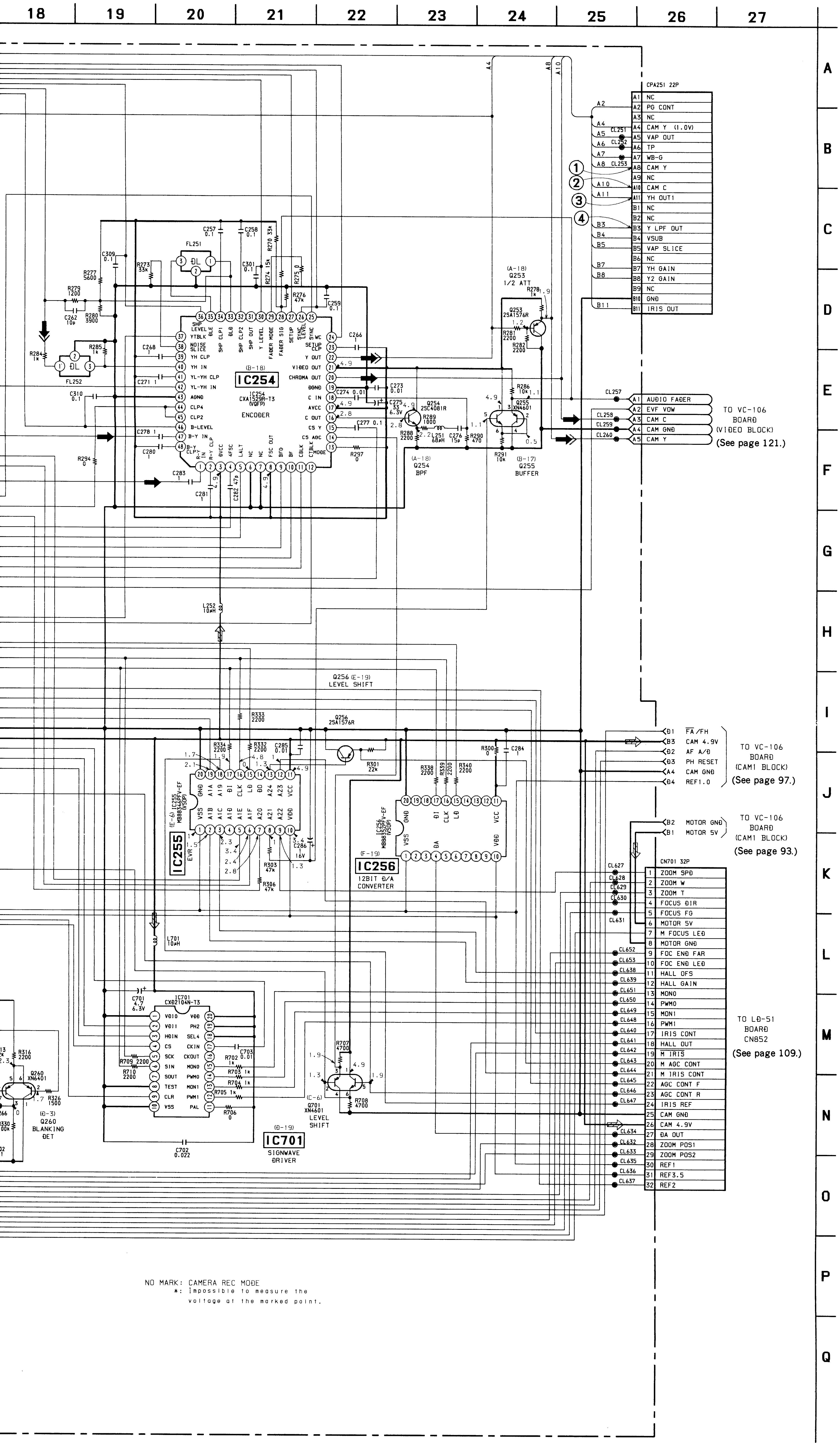

1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
VC-106 BOARD (1/3)
(CAM2 BLOCK)
VAP B30
VAP OUT B29
VAP SLICE B28
VSUB OUT B6
YH GAIN B27
Y2 GAIN B15
IRIS OUT B12
R-Y OUT B25
B-Y OUT B26
Y LPF OUT B34
YH OUT1 B35
CL255
TP B32
VAP GAIN B31
C LEVEL B19
VSUB CONT B7
PG CONT B13
Yγ CONT B33
MAX GAIN B14
θ1 B17
TO VC-106
BOARD
(CAM1 BLOCK)
(See page 95.)
SYNC B44
CLP2 B38
4FSC B45
LALT B46
BFG B37
BF B42
BLK B43
CS OUT B24
CL264
LDD B18
CAM SCK B48
CAM SO B49
REF2 B16
IRIS CONT B10
AGC CONT F B9
AGC REF B5
CAM GND A4
CAM 4.9V B3
14MHz B51
VD B41
HD B40
AGC CONT R B11
WB-G B22
WB-B B21
WB-DC B20
WB-R B23
TG STB B50
SG STB B47
CCD DET SW B8
A5
B5
B4
B7
B8
B11
B3
A11
A6
A2
A7
(B-7)
IC251
EVR
IC251
MB88341-PFV
(VSOP)
C291 0.1
C295 0.1
VSS
AOF
A10
A11
A12
A13
A14
A15
A16
VDD
GND
AOE
AOD
D1
CLK
LD
DO
A18
A17
VCC
C269 0.1
R302 2200
R307 2200
(D/AL00)
R304 3900
R305 3900
IC257
RESET
(TGSTB)
(SGSTB)
(REF3.5)
C288 0.01
(A-23)
IC257
S-8054ALB-LM-S
C287
D251
MA110-TX
(A-23)
R309 1M
X251
OSC
R311 100k
(B-21)
D253
MA110-TX
(B-21)
D254
MA110-TX
R335 3900
VDD
D/A LD2
JCS
SO CS
SO RESET
SG STB
FOC END FAR
ZOOM T
ZOOM W
RESET
XIRQ
IRQ
LANC IN
VSS
LANC OUT
CAM SI
CAM SO
SCK
FOC END LED
VDD
FG
CCD DET
FA/FH
PH RESET
MAN IRIS
CAM CS
MODEB
VSS
A VDD
A/D REF (+)
A/D REF (-)
AGC CONT
(B-22)
IC261
IC261
MC68HC11L6FU SC400607
CAMERA
CONTROL
R329 680
R328 680
R331 680
C305 0.1
Q264
UN5215
R241 10k
R242 10k
Q263
XN6215
(A-21)
Q263
INV
TO AF JIG
CN251 4P
J CS
J SI
J SCK
GND
CL611
CL612
CL613
W301 20P FP380
CAM CS
CAM SCK
CAM SO
CAM SI
LANC OUT
LANC IN
CAM REST
ZOOM C
REF 1.0V
REF 3.5V
EVER 5V
SS GND
SS 5V
BACK UP VDD
CRTC STB
VTR SI
VTR SO
VTR SCK
TITLER CS
SRAM CS
CL654
CL655
CL656
CL657
CL658
CL659
CL660
CL614
CL615
R612 680
R613 680
R614 680
R616 0
R617 10k
R618 10k
R343 1M
R344 1M
R622 0
R626 0
R628 0
TO VS-87
BOARD
CN609
(See page 128.)
CL616
CL617
CL618
CL619
CL620
CL621
CL622
CL623
CL624
CL625
CL626
04
CN302 22P
EVF W
SS GND
SRAM CS
TITLER CS
VTR SCK
VTR SO
VTR SI
CRTC STB
N.C.
VD
HD
SS 5V
BACK UP VDD
TY R
TY G
TY B
TITLE A/D
TY BLK
TC BLK
TB
TG
TR
TO TI-40 BOARD CN801
(See page 115.)

VC-106BOARD
(CAMERA REC MODE)




10
11
12
13
14
15
16
17
18
19
20
21
22
IC252
COLOR REPRODUCIBILITY CORR
IC252 CXA1609N-T3
IC253
TITLER
IC253 CXA1393AN
Q251 (1/2) XN4601
Q251 BUFFER
Q251 (2/2) XN4601
Q252 DTC144EU
IC254
ENCODER
IC254 CXA1529R-T3 (VQFP)
FL251
FL252
(CAM4.9V)
(CAMGND)
(YLEVEL)
(SHPLEVEL)
(YH)
(BURST)
(4FSC)
(LALT)
(BFG)
(BF)
(CBLK)
(CSY)
(TYR)
(TYG)
(TYB)
(TYBLK)
(TCBLK)
(TB)
(TG)
(TR)
(D/AL02)
(D/AL01)
(CAMSCK)
(CAMSO)
(WB-G)
(WB-B)
(WB-DC)
(WB-R)
(REF1.0)
(REF3.5)
Q256 LEVEL SHIFT
Q256 2SA1576R
IC255
EVR
IC255 MB88346PFV-EF (VSOP)
IC256
12BIT D/A CONVERTER
IC256 MB88346PFV-EF (VSOP)
IC258
R/G/B SELECT. DISCHARGE SWITCH
IC258 XRU4066BF
IC260 LM324D
IC260
① – ③ AW COMP
⑤ – ⑦ CURRENT SOURCE Q262
⑧ – ⑩ BUFFER
⑫ – ⑭ TRIANGLE WAVEFORMER
Q262 2SC4081R
Q261, 259 BLANKING
Q261 UN5215
Q259 XN6215
Q260 XN6401
Q260 BLANKING DET
IC261
IC261 MC68HC11L6FU SC400607
CAMERA CONTROL
Q264 UN5215
Q264 INV
X251
OSC
IC701
SIGNWAVE DRIVER
IC701 CXD2104N-T3
Q701 XN4601
LEVEL SHIFT
L252 10μH
L701 10μH

NO MARK: CAMERA REC MODE
*: Impossible to measure the voltage at the marked point.


18
19
20
21
22
23
24
25
26
27
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
CPA251 22P
A1 NC
A2 PG CONT
A3 NC
A4 CAM Y (1.0V)
A5 VAP OUT
A6 TP
A7 WB-G
A8 CAM Y
A9 NC
A10 CAM C
A11 YH OUT1
B1 NC
B2 NC
B3 Y LPF OUT
B4 VSUB
B5 VAP SLICE
B6 NC
B7 YH GAIN
B8 Y2 GAIN
B9 NC
B10 GND
B11 IRIS OUT
CL251
CL252
CL253
IC254
CXA1529R-T3 (VQFP)
ENCODER
(B-18)
FL251
FL252
Q253
1/2 ATT
(A-18)
Q253 2SA1576R
Q254 2SC4081R
(A-18) Q254 BPF
Q255 XN4601
(B-17) Q255 BUFFER
L251 68μH
A1 AUDIO FADER
A2 EVF VDW
A3 CAM C
A4 CAM GND
A5 CAM Y
CL257
CL258
CL259
CL260
TO VC-106 BOARD (VIDEO BLOCK) (See page 121.)
Q256 (E-19) LEVEL SHIFT
Q256 2SA1576R
IC255 MB88346PFV-EF (VSOP)
(E-19) IC255
IC256 MB88352PFV-EF (VSOP)
(F-19) IC256
12BIT D/A CONVERTER
D1 FA/FH
B3 CAM 4.9V
D2 AF A/D
D3 PH RESET
A4 CAM GND
D4 REF1.0
TO VC-106 BOARD (CAM1 BLOCK) (See page 97.)
B2 MOTOR GND
B1 MOTOR 5V
TO VC-106 BOARD (CAM1 BLOCK) (See page 93.)
L252 10μH
L701 10μH
IC701 CXD2104N-T3
(D-19) IC701 SIGNWAVE DRIVER
Q701 XN4601
(C-6) Q701 LEVEL SHIFT
Q260 XN6401
(D-3) Q260 BLANKING DET
CN701 32P
1 ZOOM SPD
2 ZOOM W
3 ZOOM T
4 FOCUS DIR
5 FOCUS FG
6 MOTOR 5V
7 M FOCUS LED
8 MOTOR GND
9 FOC END FAR
10 FOC END LED
11 HALL OFS
12 HALL GAIN
13 MONO
14 PWMO
15 MON1
16 PWM1
17 IRIS CONT
18 HALL OUT
19 M IRIS
20 M AGC CONT
21 M IRIS CONT
22 AGC CONT F
23 AGC CONT R
24 IRIS REF
25 CAM GND
26 CAM 4.9V
27 DA OUT
28 ZOOM POS1
29 ZOOM POS2
30 REF1
31 REF3.5
32 REF2
TO LD-51 BOARD CN852 (See page 109.)

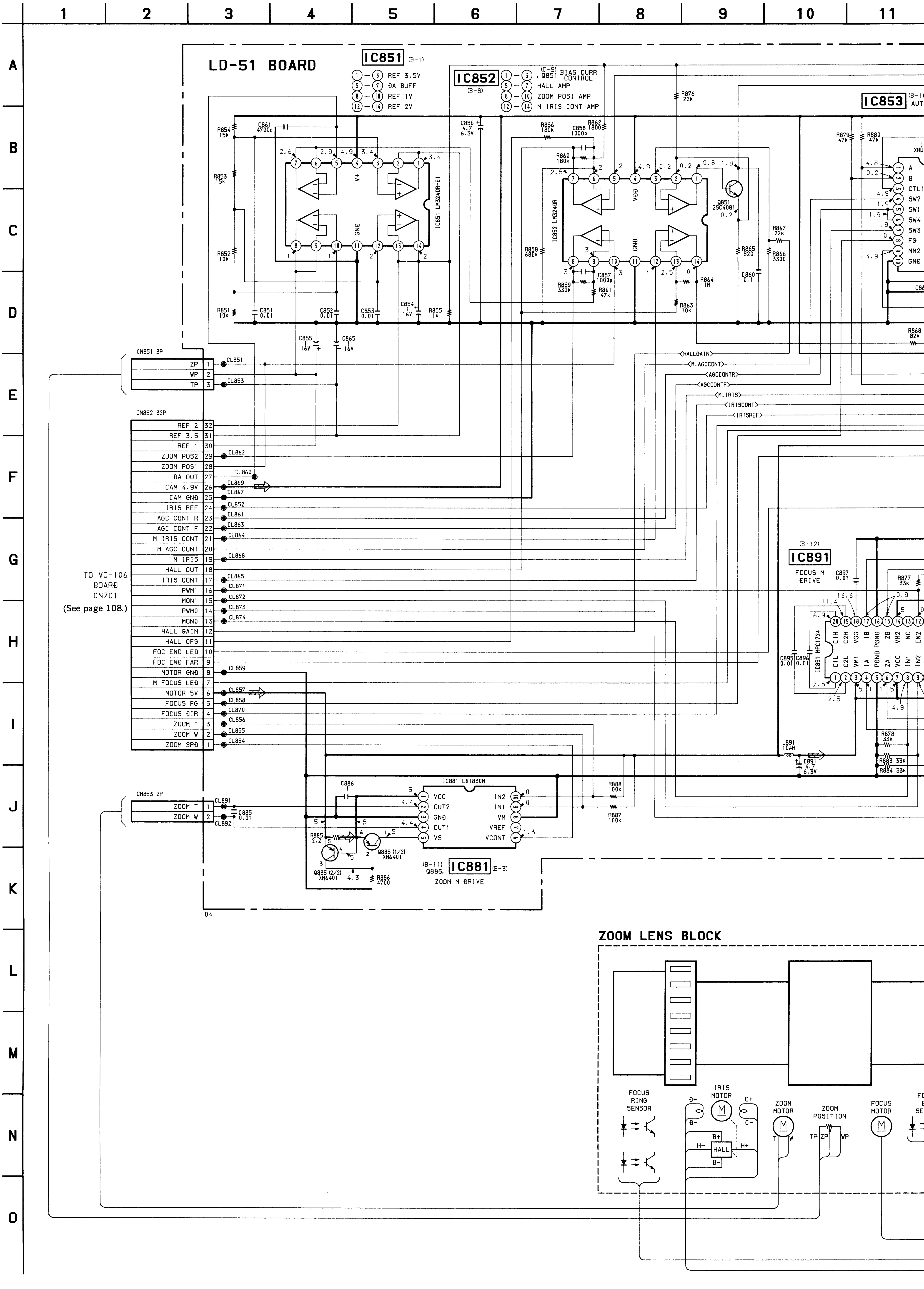
NO MARK: CAMERA REC MODE
*: Impossible to measure the voltage at the marked point.

• Signal path

	VIDEO Signal		
	CHROMA	Y	Y/CHROMA
REC	➡	➡➤	➡➤➤
PB	⇨	⇨⇨	⇨⇨⇨

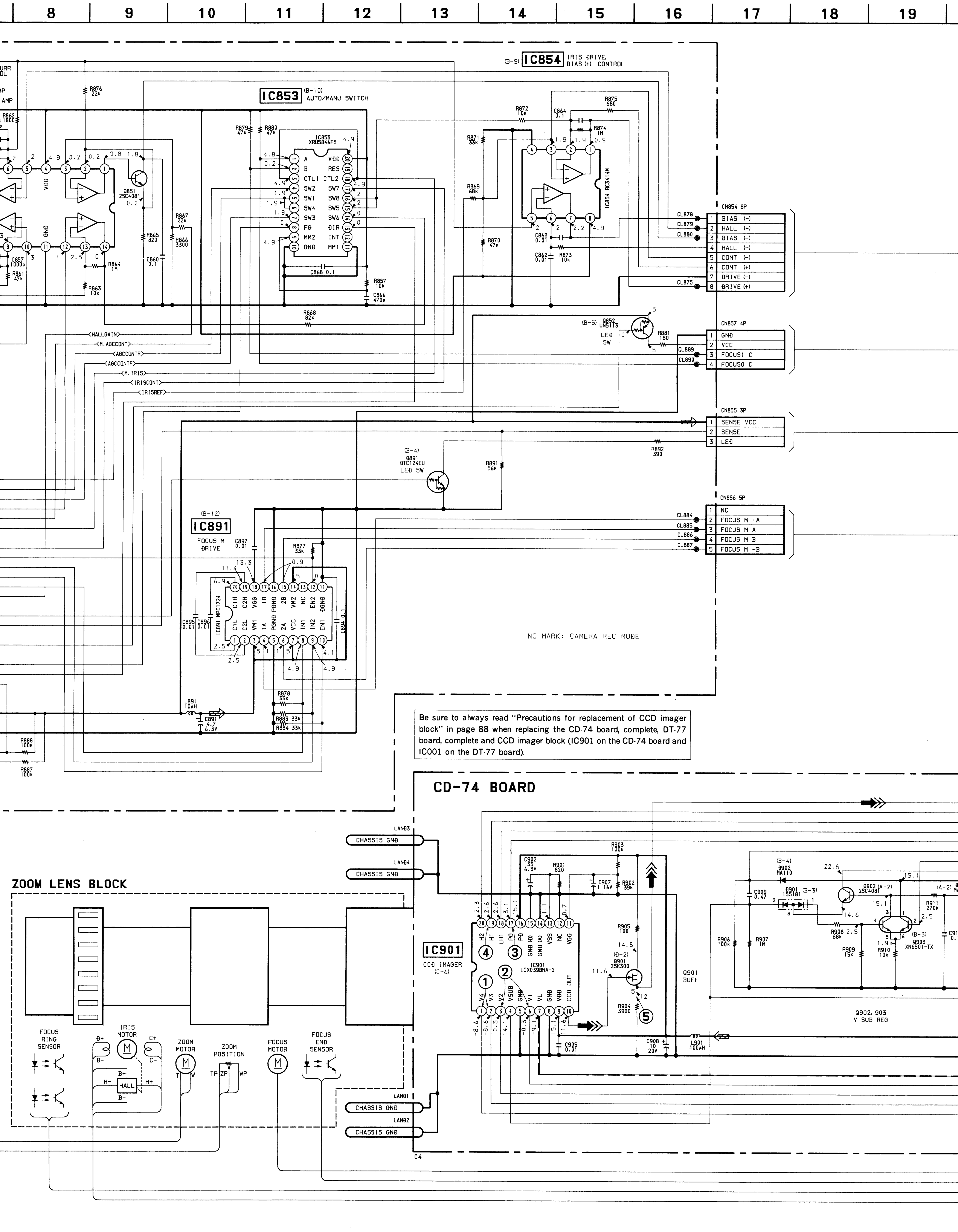
CD-74 (CCD IMAGER) LD-51 (IRIS/ZOOM/FOCUS MOTOR DRIVE) SCHEMATIC DIAGRAM

—Ref. No. CD-74 and LD-51 BOARDS : 2000 series—



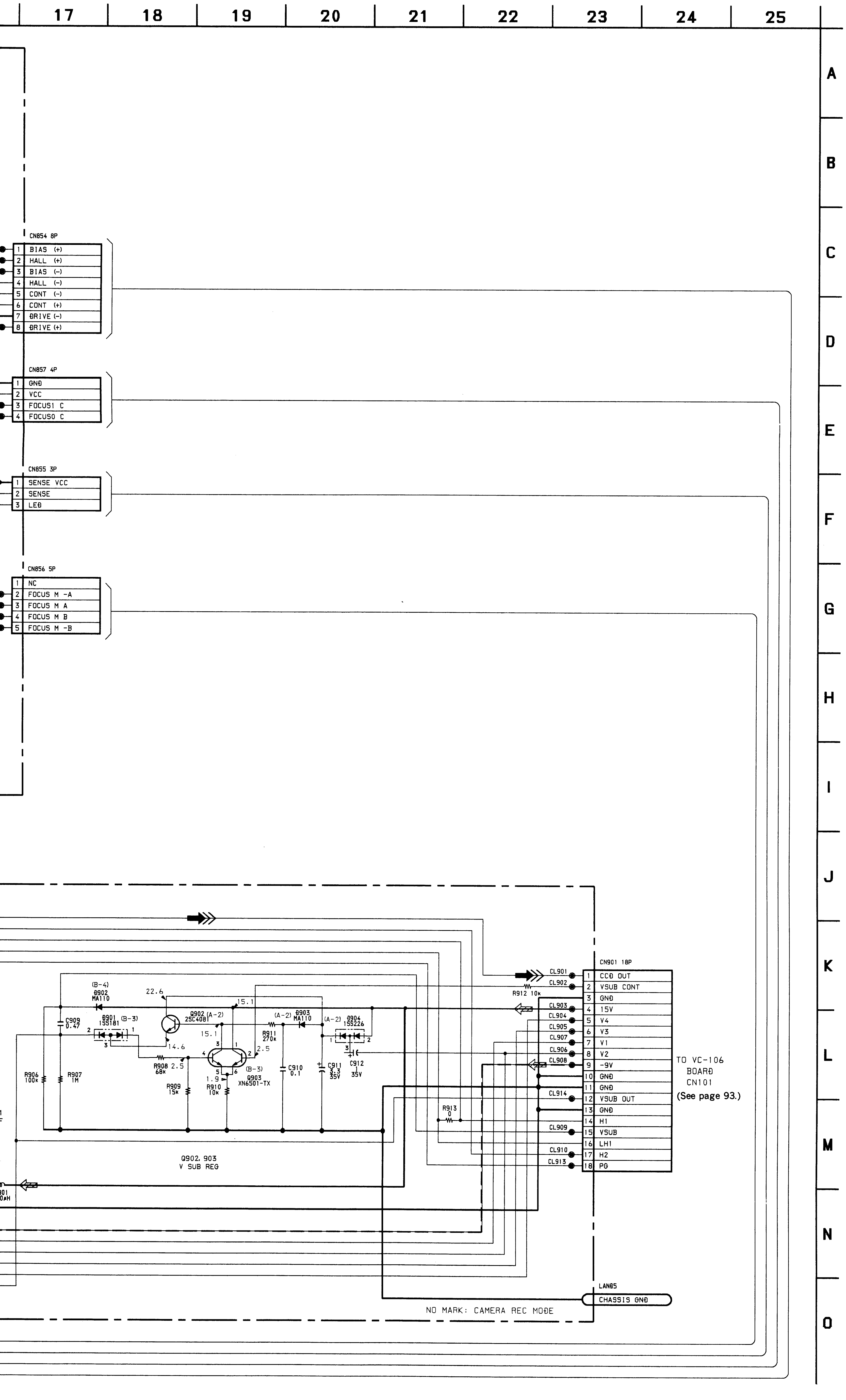
LD-51 BOARD
IC851 (B-1)
①–③ REF 3.5V
⑤–⑦ ĐA BUFF
⑧–⑩ REF 1V
⑫–⑭ REF 2V
IC852 (B-8)
①–③ , Q851 (C-9) BIAS CURR CONTROL
⑤–⑦ HALL AMP
⑧–⑩ ZOOM POSI AMP
⑫–⑭ M IRIS CONT AMP
IC853 (B-1
IC851 LM324ØR-E1
IC852 LM324ØR
Q851 2SC4081
CN851 3P
ZP 1
WP 2
TP 3
CN852 32P
REF 2 32
REF 3.5 31
REF 1 30
ZOOM POS2 29
ZOOM POS1 28
ĐA OUT 27
CAM 4.9V 26
CAM GNĐ 25
IRIS REF 24
AGC CONT R 23
AGC CONT F 22
M IRIS CONT 21
M AGC CONT 20
M IRIS 19
HALL OUT 18
IRIS CONT 17
PWM1 16
MON1 15
PWM0 14
MON0 13
HALL GAIN 12
HALL OFS 11
FOC END LEĐ 10
FOC END FAR 9
MOTOR GNĐ 8
M FOCUS LEĐ 7
MOTOR 5V 6
FOCUS FG 5
FOCUS ĐIR 4
ZOOM T 3
ZOOM W 2
ZOOM SPĐ 1
TO VC-106 BOARĐ CN701 (See page 108.)
CN853 2P
ZOOM T 1
ZOOM W 2
<HALLØAIN>
<M.AGCCONT>
<AGCCONTR>
<AGCCONTF>
<M.IRIS>
<IRISCONT>
<IRISREF>
IC891 (B-12)
FOCUS M ĐRIVE
IC891 MPC1724
IC881 LB1830M
VCC OUT2 GNĐ OUT1 VS
IN2 IN1 VM VREF VCONT
Q885 (1/2) XN6401
Q885 (2/2) XN6401
IC881 (B-3) Q885 (B-11)
ZOOM M ĐRIVE
ZOOM LENS BLOCK
FOCUS RING SENSOR
IRIS MOTOR
HALL
ZOOM MOTOR
ZOOM POSITION
FOCUS MOTOR

CAMERA (3), TITLER CAMERA (3), TITER

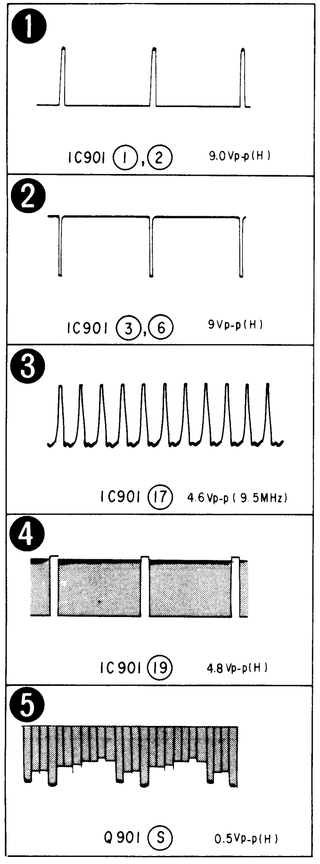

8
9
10
11
12
13
14
15
16
17
18
19
IC854 (B-9) IRIS DRIVE, BIAS (+) CONTROL
IC853 (B-10) AUTO/MANU SWITCH
IC853 XRU5846FS
A
B
CTL1
SW2
SW1
SW4
SW3
FG
MM2
GND
VDD
RES
CTL2
SW7
SW8
SW5
SW6
DIR
INT
MM1
IC854 RC3414M
Q851 2SC4081
R876 22k
R879 47k
R880 47k
R872 10k
C864 0.1
R875 680
R874 1M
R871 33k
R869 68k
R870 47k
C863 0.01
C862 0.01
R873 10k
R867 22k
R865 820
R866 3300
C860 0.1
R864 1M
R863 10k
C857 1000p
R861 47k
C868 0.1
R857 10k
C866 470p
R868 82k
CN854 8P
BIAS (+)
HALL (+)
BIAS (-)
HALL (-)
CONT (-)
CONT (+)
DRIVE (-)
DRIVE (+)
CL878
CL879
CL880
CL875
(B-5) Q852 UN5113 LED SW
R881 180
CN857 4P
GND
VCC
FOCUS1 C
FOCUS0 C
CL889
CL890
CN855 3P
SENSE VCC
SENSE
LED
R892 390
(B-4) Q891 DTC124EU LED SW
R891 56k
CN856 5P
NC
FOCUS M -A
FOCUS M A
FOCUS M B
FOCUS M -B
CL884
CL885
CL886
CL887
<HALLGAIN>
<M.AGCCONT>
<AGCCONTR>
<AGCCONTF>
<M.IRIS>
<IRISCONT>
<IRISREF>
(B-12) IC891 FOCUS M DRIVE
IC891 MPC1724
C897 0.01
R877 33k
C1H
C2H
VGG
1B
PGND
2B
VM2
NC
EN2
DGND
C1L
C2L
VM1
1A
PGND
2A
VCC
IN1
IN2
EN1
C895 0.01
C896 0.01
C894 0.1
NO MARK: CAMERA REC MODE
L891 10μH
C891 4.7 6.3V
R878 33k
R883 33k
R884 33k
R888 100k
R887 100k
R862 1800
CD-74 BOARD
LND3
LND4
LND1
LND2
CHASSIS GND
ZOOM LENS BLOCK
IC901 CCD IMAGER (C-6)
IC901 ICX039BNA-2
H2
H1
LH1
PG
PD
GND (D)
GND (A)
VSS
NC
VGG
V4
V3
V2
VSUB
GND
V1
VL
GND
VDD
CCD OUT
C902 33 6.3V
R901 820
R903 100k
C907 1 16V
R902 39k
R905 100
(B-2) Q901 2SK300
Q901 BUFF
R904 3900
C905 0.01
C908 10 20V
L901 100μH
(B-4) D902 MA110
D901 1SS181 (B-3)
Q902 2SC4081 (A-2)
C909 0.47
R906 100k
R907 1M
R908 68k
R909 15k
R910 10k
R911 270k
Q903 XN6501-TX
(B-3)
Q902, 903 V SUB REG
FOCUS RING SENSOR
IRIS MOTOR
HALL
ZOOM MOTOR
ZOOM POSITION
FOCUS MOTOR
FOCUS END SENSOR
04

Be sure to always read "Precautions for replacement of CCD imager block" in page 88 when replacing the CD-74 board, complete, DT-77 board, complete and CCD imager block (IC901 on the CD-74 board and IC001 on the DT-77 board).

CAMERA (3), TIT


17
18
19
20
21
22
23
24
25
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
CN854 8P
1 BIAS (+)
2 HALL (+)
3 BIAS (-)
4 HALL (-)
5 CONT (-)
6 CONT (+)
7 DRIVE (-)
8 DRIVE (+)
CN857 4P
1 GND
2 VCC
3 FOCUS1 C
4 FOCUS0 C
CN855 3P
1 SENSE VCC
2 SENSE
3 LED
CN856 5P
1 NC
2 FOCUS M -A
3 FOCUS M A
4 FOCUS M B
5 FOCUS M -B
(B-4)
D902
MA110
22.6
15.1
C909
0.47
D901
1SS181
(B-3)
Q902 (A-2)
2SC4081
15.1
14.6
R911
270k
(A-2)
D903
MA110
(A-2)
D904
1SS226
2.5
R908 2.5
68k
1.9
R909
15k
R910
10k
(B-3)
Q903
XN6501-TX
C910
0.1
C911
3.3
35V
C912
1
35V
R906
100k
R907
1M
Q902, 903
V SUB REG
R913
0
R912 10k
CL901
CL902
CL903
CL904
CL905
CL907
CL906
CL908
CL914
CL909
CL910
CL913
CN901 18P
1 CCD OUT
2 VSUB CONT
3 GND
4 15V
5 V4
6 V3
7 V1
8 V2
9 -9V
10 GND
11 GND
12 VSUB OUT
13 GND
14 H1
15 VSUB
16 LH1
17 H2
18 PG
TO VC-106
BOARD
CN101
(See page 93.)
LAN65
CHASSIS GND
NO MARK: CAMERA REC MODE

CD-74BOARD



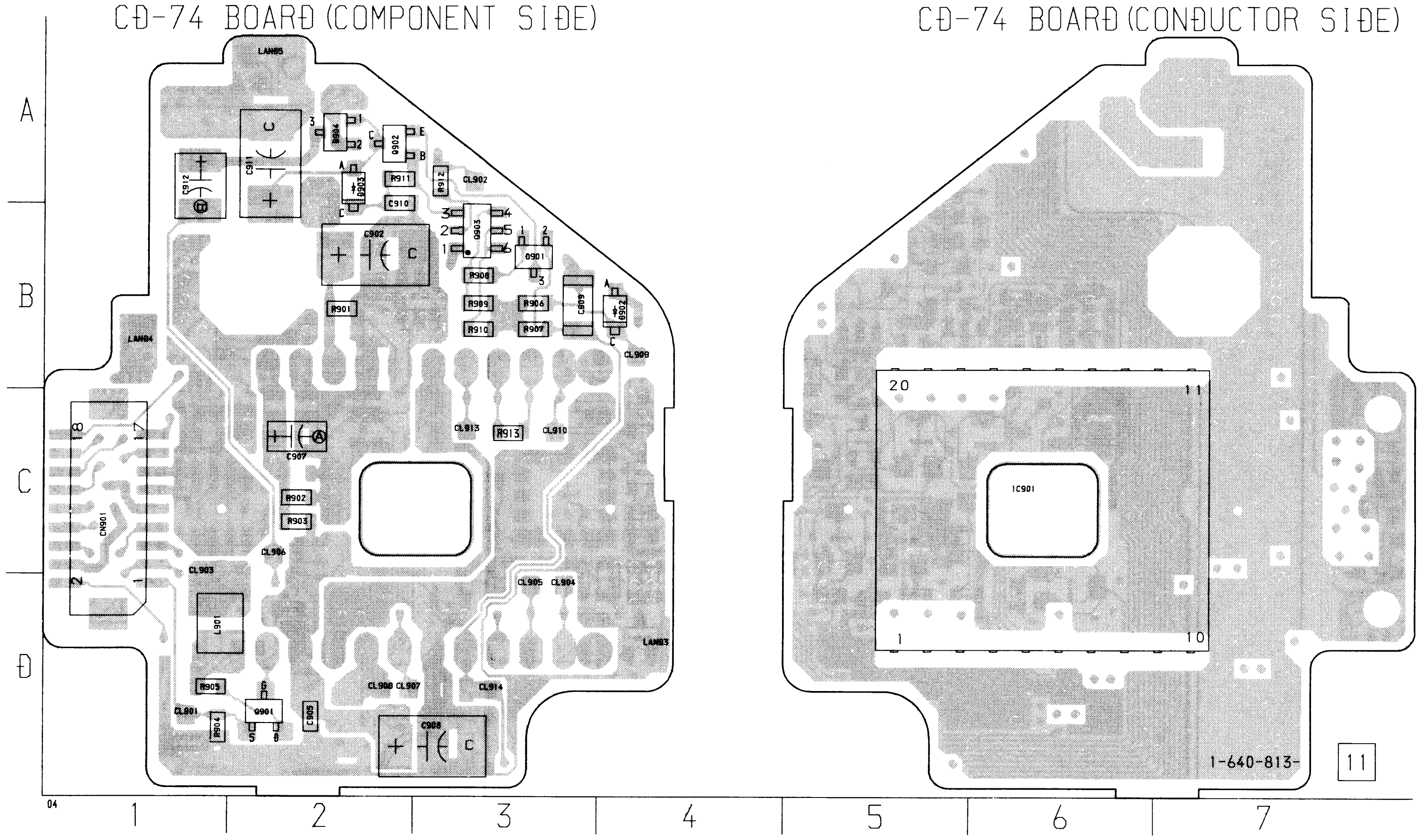
- **Signal path**

	VIDEO Signal		
	CHROMA	Y	Y/CHROMA
REC	➡	⇛	➡≫
PB			

CAMERA (3), TITLER CAMERA (3), TITER

CD-74 (CCD IMAGER) LD-51 (IRIS/ZOOM/FOCUS MOTOR DRIVE) PRINTED WIRING BOARDS

—Ref. No. CD-74 and LD-51 BOARDS : 2000 series—


CD-74 BOARD (COMPONENT SIDE)
CD-74 BOARD (CONDUCTOR SIDE)
A
B
C
D
1
2
3
4
5
6
7
04
IC901
CN901
L901
Q901
Q902
Q903
D901
D902
D903
D904
C902
C907
C908
C909
C911
C912
R901
R902
R903
R904
R905
R906
R907
R908
R909
R910
R911
R912
R913
CL901
CL902
CL903
CL904
CL905
CL906
CL907
CL908
CL909
CL910
CL913
CL914
LAN83
LAN84
LAN85
20
11
1
10
1-640-813-
11

< DIODE >

D901	8-719-820-05	1SS181
D902	8-719-404-46	MA110
D903	8-719-404-46	MA110
D904	8-719-800-76	1SS226

< IC >

IC901	8-752-606-77	IC ICX039BNA-2 (

< TRANSISTOR >

Q901	8-729-232-86	2SK1875-BL/V-TE8
Q902	8-729-905-35	2SC4081-R
Q903	8-729-402-19	XN6501

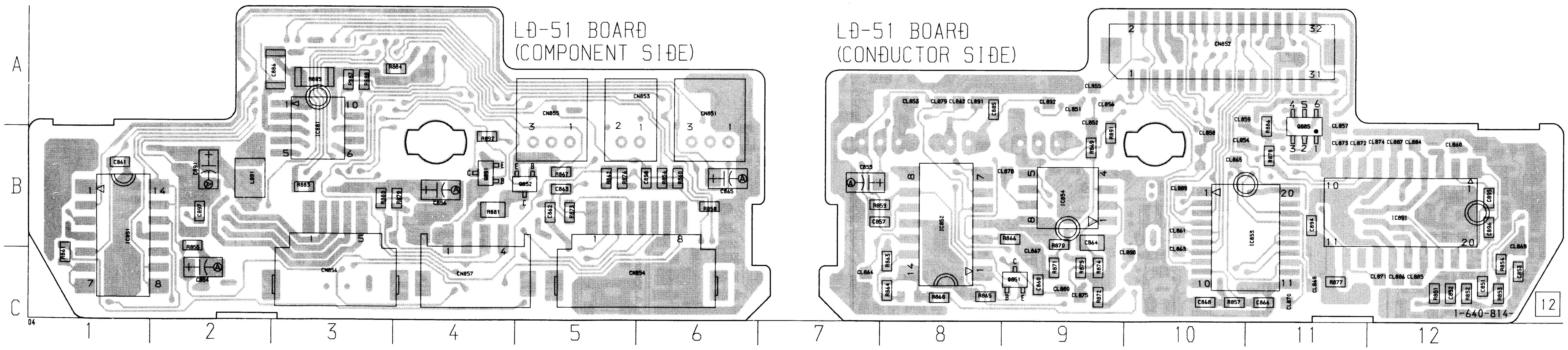
Be sure to always read "Precautions for r
block" in page 88 when replacing the CD-
board, complete and CCD imager block (IC9
IC001 on the DT-77 board).

< IC >

IC851	8-759-998-96	LM324D
IC852	8-759-998-96	LM324D
IC853	8-759-513-26	XRU5846FS
IC854	8-759-981-82	RC3414M
IC881	8-759-823-51	LB1830M
IC891	8-759-038-81	MPC1724M

< TRANSISTOR >

Q851	8-729-905-35	2SC4081-R
Q852	8-729-403-35	UN5113
Q885	8-729-925-42	IMT2
Q891	8-729-905-61	DTC124EU


LD-51 BOARD (COMPONENT SIDE)
LD-51 BOARD (CONDUCTOR SIDE)
A
B
C
1
2
3
4
5
6
7
8
9
10
11
12
04
IC851
IC852
IC853
IC854
IC881
IC891
Q851
Q852
Q885
Q891
CN851
CN852
CN853
CN854
CN855
CN856
CN857
1-640-814-
12

TI-40 (TITLER) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

—Ref. No. TI-40 BOARD : 3000 series—

< DIODE >

D901	8-719-820-05	1SS181
D902	8-719-404-46	MA110
D903	8-719-404-46	MA110
D904	8-719-800-76	1SS226

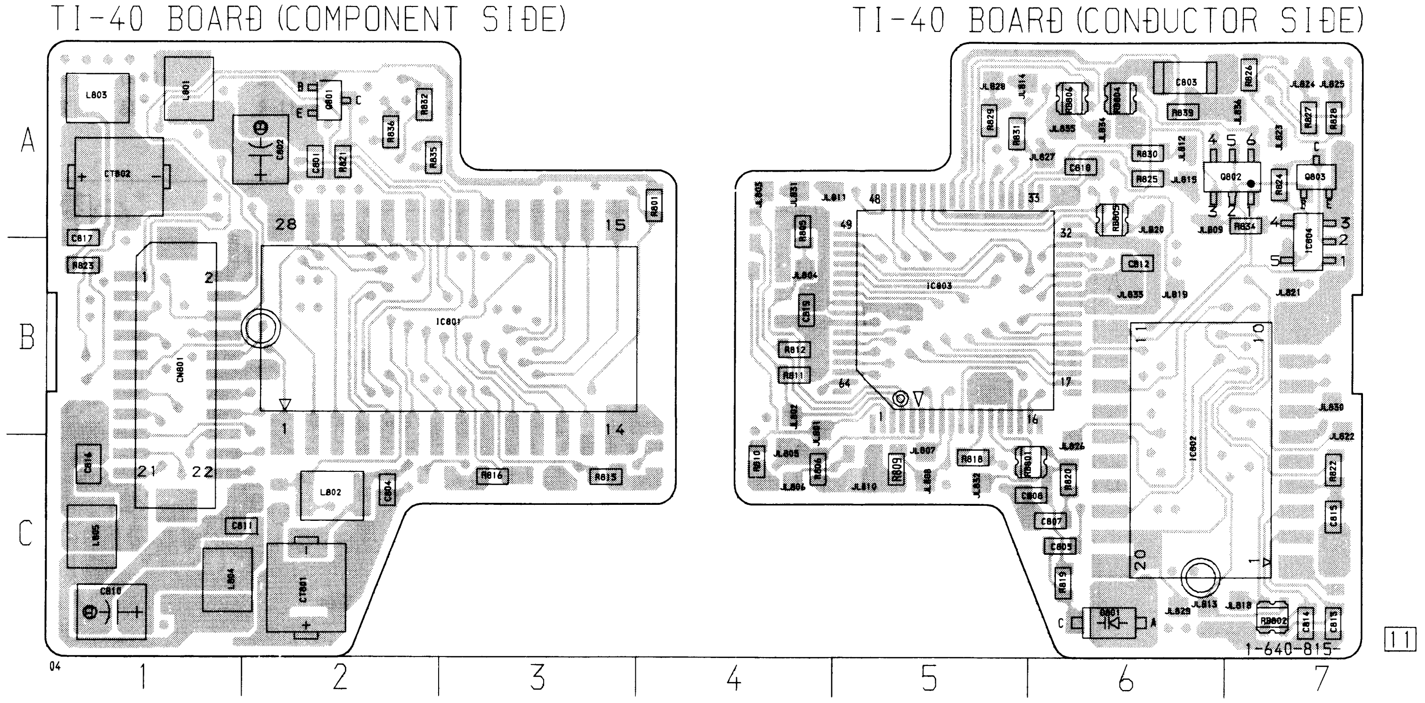
< IC >

IC901	8-752-606-77	IC ICX039BNA-2 (CCD IMAGER)

< TRANSISTOR >

Q901	8-729-232-86	2SK1875-BL/V-TE85L
Q902	8-729-905-35	2SC4081-R
Q903	8-729-402-19	XN6501

Be sure to always read "Precautions for replacement of CCD imager block" in page 88 when replacing the CD-74 board, complete, DT-77 board, complete and CCD imager block (IC901 on the CD-74 board and IC001 on the DT-77 board).


TI-40 BOARD (COMPONENT SIDE)
TI-40 BOARD (CONDUCTOR SIDE)
A
B
C
1
2
3
4
5
6
7
IC801
CN801
IC803
IC802
Q801
Q802
D801
IC804
L801
L802
L803
L804
L805
CT801
CT802
1-640-815-
11
04

< DIODE >

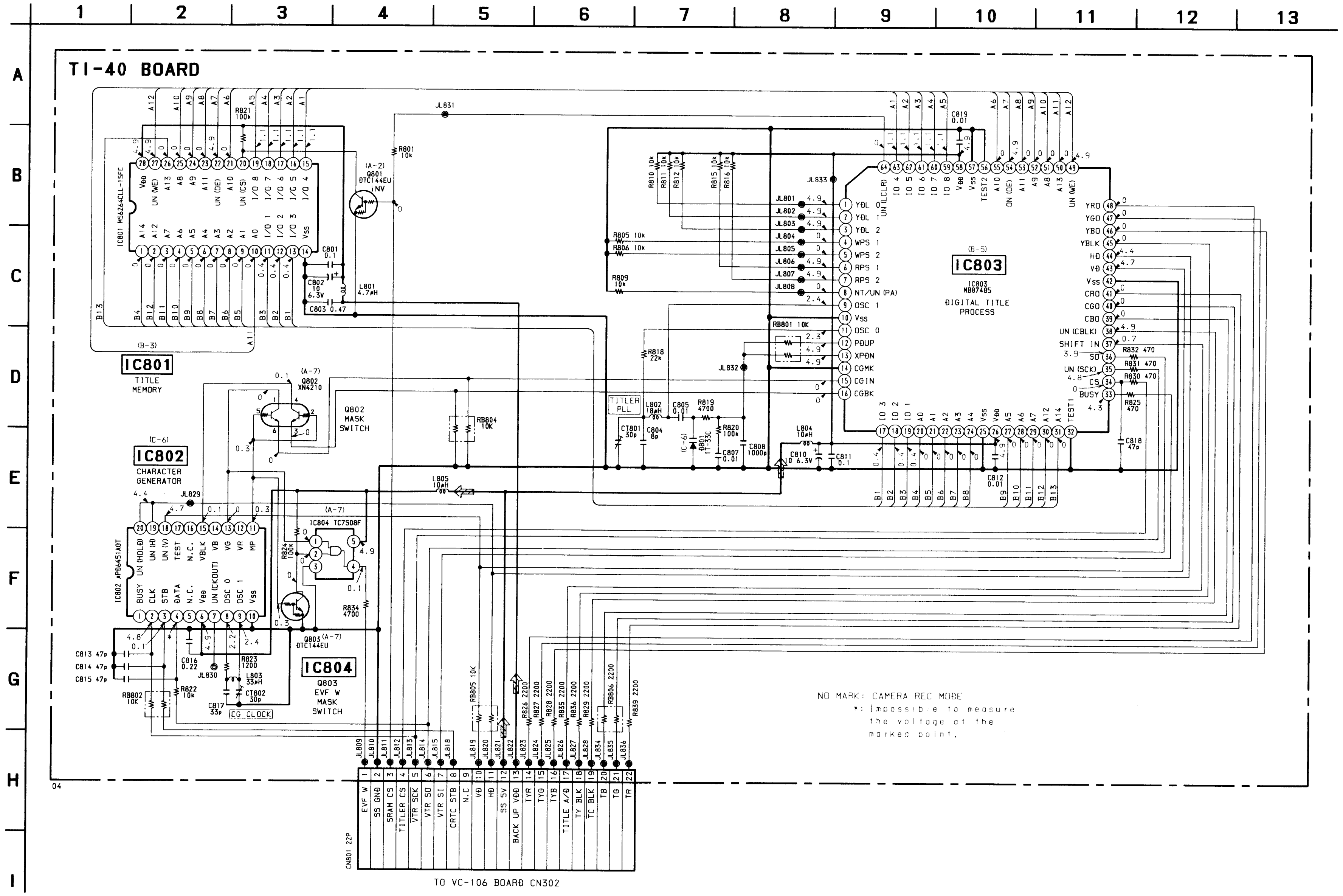
D801	8-713-300-88	1T33C

< IC >

IC801	8-759-507-53	MS6264CLL
IC802	8-759-518-62	MB-90071-104-PF
IC803	8-759-053-02	MB87818
IC804	8-759-234-20	TC7S08F

< TRANSISTOR >

Q801	8-729-905-18	DTC144EU
Q802	8-729-403-24	XN4210
Q803	8-729-905-18	DTC144EU


TI-40 BOARD
1
2
3
4
5
6
7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
IC801
TITLE MEMORY
IC801 MS6264CLL-15FC
(B-3)
Q801 DTC144EU INV
(A-2)
Q802 XN4210
MASK SWITCH
(A-7)
IC802
CHARACTER GENERATOR
IC802 μPB6451A0T
(C-6)
IC804 TC7S08F
(A-7)
Q803 DTC144EU
IC804
Q803
EVF W MASK SWITCH
EG CLOCK
IC803
IC803 MB87485
DIGITAL TITLE PROCESS
(B-5)
TITLER PLL
CN801 22P
EVF W
SS GND
SRAM CS
TITLER CS
VTR SCK
VTR SO
VTR SI
CRTC STB
N.C
VD
HD
SS 5V
BACK UP VDD
TYB
TYG
TITLE A/B
TY BLK
TC BLK
TB
TG
TR
TO VC-106 BOARD CN302
(See page 105.)
NO MARK: CAMERA REC MODE
*: Impossible to measure the voltage of the marked point.
04

< DIODE >

D152	8-719-949-46	1T32
D153	8-719-404-46	MA110
D251	8-719-404-46	MA110
D253	8-719-404-46	MA110
D254	8-719-404-46	MA110
D351	8-719-404-46	MA110
D401	8-719-421-03	MA732
D402	8-719-404-35	MA141WK
D403	8-719-820-05	1SS181
D404	8-719-820-05	1SS181
D405	8-719-404-35	MA141WK
D406	8-719-404-46	MA110
D551	8-719-404-46	MA110
D552	8-719-404-35	MA141WK
D553	8-719-404-46	MA110

< HIC >

HIC101	A-7068-194-A	DT-77 BOARD, COMPLETE

< IC >

IC151	8-752-339-77	CXD2111R-T3
IC201	8-752-340-34	CXL1507AN
IC202	8-752-332-69	CXL5504M
IC203	8-752-038-97	CXA1391R
IC204	8-759-946-00	MB88341PFV
IC251	8-759-946-00	MB88341PFV
IC252	8-752-056-04	CXA1609N
IC253	8-752-039-49	CXA1393AN
IC254	8-752-057-59	CXA1592R
IC255	8-759-521-09	MB88346APFV
IC256	8-759-512-59	MB88352PFV
IC257	8-759-937-56	S-8054ALB-LM-S
IC258	8-759-008-67	MC14066BF
IC260	8-759-998-96	LM324D
IC261	8-759-044-05	MC68HC11L6FUSC400607
IC351	8-759-605-61	CXA1203N
IC401	8-752-036-19	CXA1207AR
IC501	8-752-036-20	CXA1208R
IC551	8-752-333-24	CXL1506M
IC552	8-752-333-24	CXL1506M
IC701	8-752-348-74	CXD2104AN
IC731	8-759-998-92	LM393D
IC732	8-759-509-17	XRU4053BF
IC733	8-759-998-98	LM358D

< TRANSISTOR >

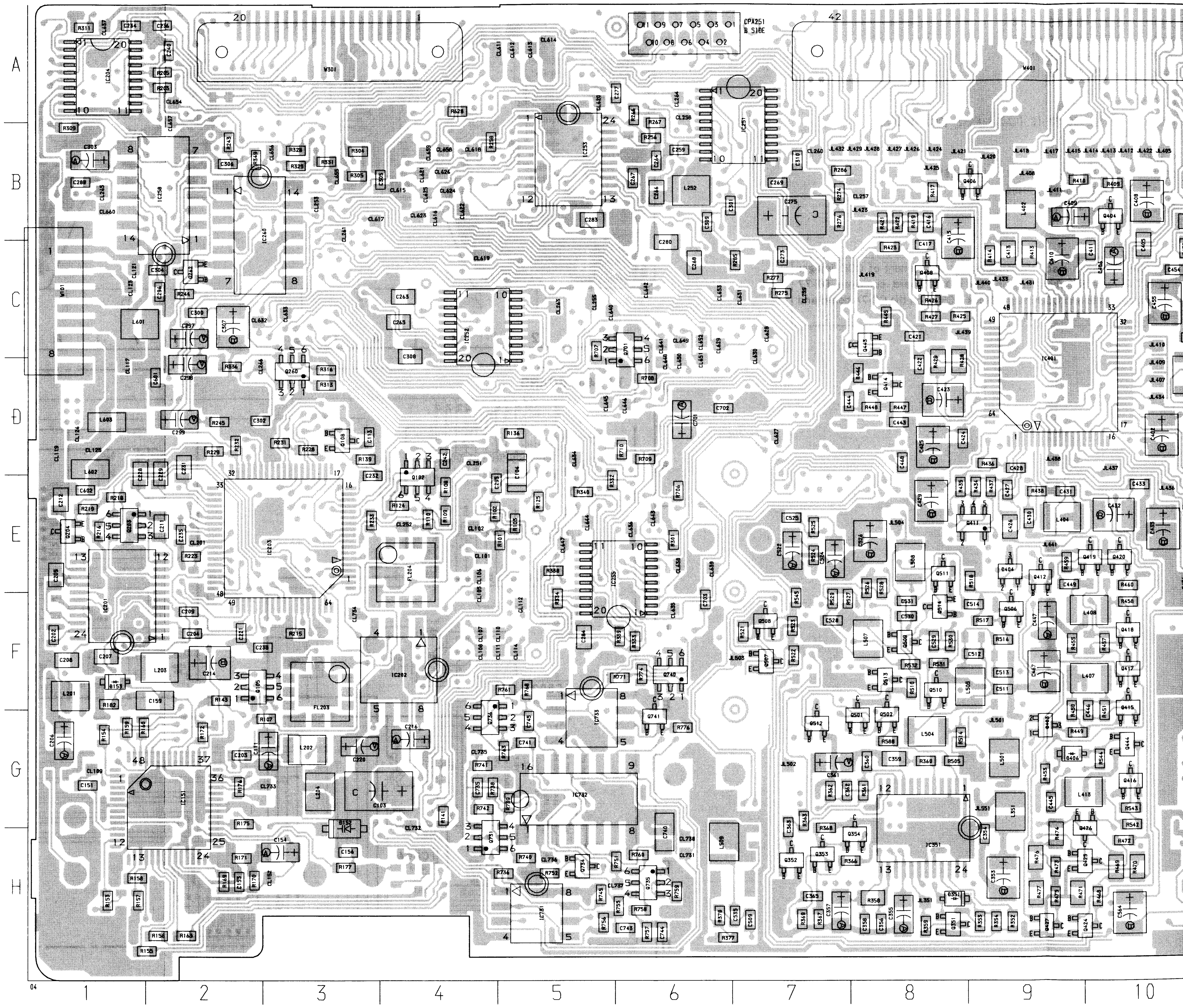
Q101	8-729-907-46	IMZ1
Q102	8-729-907-46	IMZ1
Q103	8-729-907-46	IMZ1
Q104	8-729-925-42	IMT2
Q105	8-729-907-46	IMZ1
Q106	8-729-907-46	IMZ1
Q107	8-729-402-45	UN5212
Q108	8-729-905-35	2SC4081-R
Q151	8-729-905-35	2SC4081-R
Q201	8-729-905-23	2SA1576-R
Q202	8-729-905-23	2SA1576-R
Q203	8-729-925-42	IMT2
Q204	8-729-905-23	2SA1576-R
Q205	8-729-905-23	2SA1576-R
Q251	8-729-907-46	IMZ1
Q252	8-729-905-18	DTC144EU
Q253	8-729-905-23	2SA1576-R
Q254	8-729-905-35	2SC4081-R
Q255	8-729-907-46	IMZ1
Q256	8-729-905-23	2SA1576-R
Q259	8-729-925-39	IMH8
Q260	8-729-925-42	IMT2
Q261	8-729-420-50	UN5215
Q262	8-729-905-35	2SC4081-R
Q263	8-729-925-39	IMH8
Q264	8-729-420-50	UN5215
Q351	8-729-905-12	DTA144EU
Q352	8-729-905-18	DTC144EU
Q353	8-729-905-35	2SC4081-R
Q354	8-729-905-35	2SC4081-R
Q355	8-729-905-35	2SC4081-R
Q356	8-729-905-18	DTC144EU
Q401	8-729-920-48	IMH2
Q402	8-729-907-39	IMD2
Q403	8-729-905-23	2SA1576-R
Q404	8-729-905-18	DTC144EU
Q405	8-729-824-05	3SK248
Q406	8-729-905-18	DTC144EU
Q408	8-729-905-12	DTA144EU
Q409	8-729-824-02	2SA1838-TL
Q410	8-729-905-12	DTA144EU
Q411	8-729-403-06	XN1113
Q412	8-729-905-18	DTC144EU
Q413	8-729-905-18	DTC144EU
Q414	8-729-423-52	2SC3931
Q415	8-729-824-02	2SA1838
Q416	8-729-905-18	DTC144EU
Q417	8-729-905-35	2SC4081-R
Q418	8-729-905-23	2SA1576-R
Q419	8-729-905-23	2SA1576-R
Q420	8-729-905-35	2SC4081-R
Q421	8-729-905-18	DTC144EU
Q422	8-729-823-16	2SC4555-5. 6. 7
Q423	8-729-823-16	2SC4555-5. 6. 7
Q424	8-729-905-18	DTC144EU
Q425	8-729-905-18	DTC144EU
Q426	8-729-905-12	DTA144EU
Q427	8-729-905-18	DTC144EU
Q428	8-729-905-18	DTC144EU
Q429	8-729-905-18	DTC144EU
Q430	8-729-423-52	2SC3931
Q431	8-729-423-52	2SC3931
Q432	8-729-907-26	IMX1
Q433	8-729-905-35	2SC4081-R
Q434	8-729-905-35	2SC4081-R
Q435	8-729-905-12	DTA144EU
Q437	8-729-403-06	XN1113
Q438	8-729-423-52	2SC3931
Q439	8-729-920-99	DTA114EU
Q440	8-729-905-23	2SA1576-R
Q441	8-729-403-06	XN1113
Q442	8-729-403-07	XN1213
Q443	8-729-905-18	DTC144EU
Q444	8-729-905-18	DTC144EU
Q446	8-729-905-18	DTC144EU
Q447	8-729-905-18	DTC144EU
Q501	8-729-905-35	2SC4081-R
Q502	8-729-905-35	2SC4081-R
Q505	8-729-905-23	2SA1576-R
Q506	8-729-905-35	2SC4081-R
Q507	8-729-905-35	2SC4081-R
Q508	8-729-905-35	2SC4081-R
Q509	8-729-905-12	DTA144EU
Q510	8-729-423-52	2SC3931
Q511	8-729-905-18	DTC144EU
Q512	8-729-905-35	2SC4081-R
Q513	8-729-905-18	DTC144EU
Q514	8-729-905-18	DTC144EU
Q551	8-729-807-87	2SB1295-UL6
Q552	8-729-905-18	DTC144EU

VC-106 (VIDEO) PRINTED WIRING BOARD

—Ref. No. VC-106 BOARD : 1000 series—

Q553	8-729-807-87	2SB1295-UL6
Q554	8-729-905-18	DTC144EU
Q555	8-729-905-23	2SA1576-R
Q556	8-729-905-35	2SC4081-R
Q557	8-729-905-35	2SC4081-R
Q558	8-729-905-18	DTC144EU
Q559	8-729-905-23	2SA1576-R
Q560	8-729-905-35	2SC4081-R
Q701	8-729-907-46	IMZ1
Q731	8-729-920-59	IMX2
Q733	8-729-905-35	2SC4081-R
Q734	8-729-905-23	2SA1576-R
Q735	8-729-920-59	IMX2
Q736	8-729-920-59	IMX2
Q737	8-729-907-46	IMZ1
Q738	8-729-905-23	2SA1576-R
Q739	8-729-905-35	2SC4081-R
Q740	8-729-920-59	IMX2
Q741	8-729-905-35	2SC4081-R

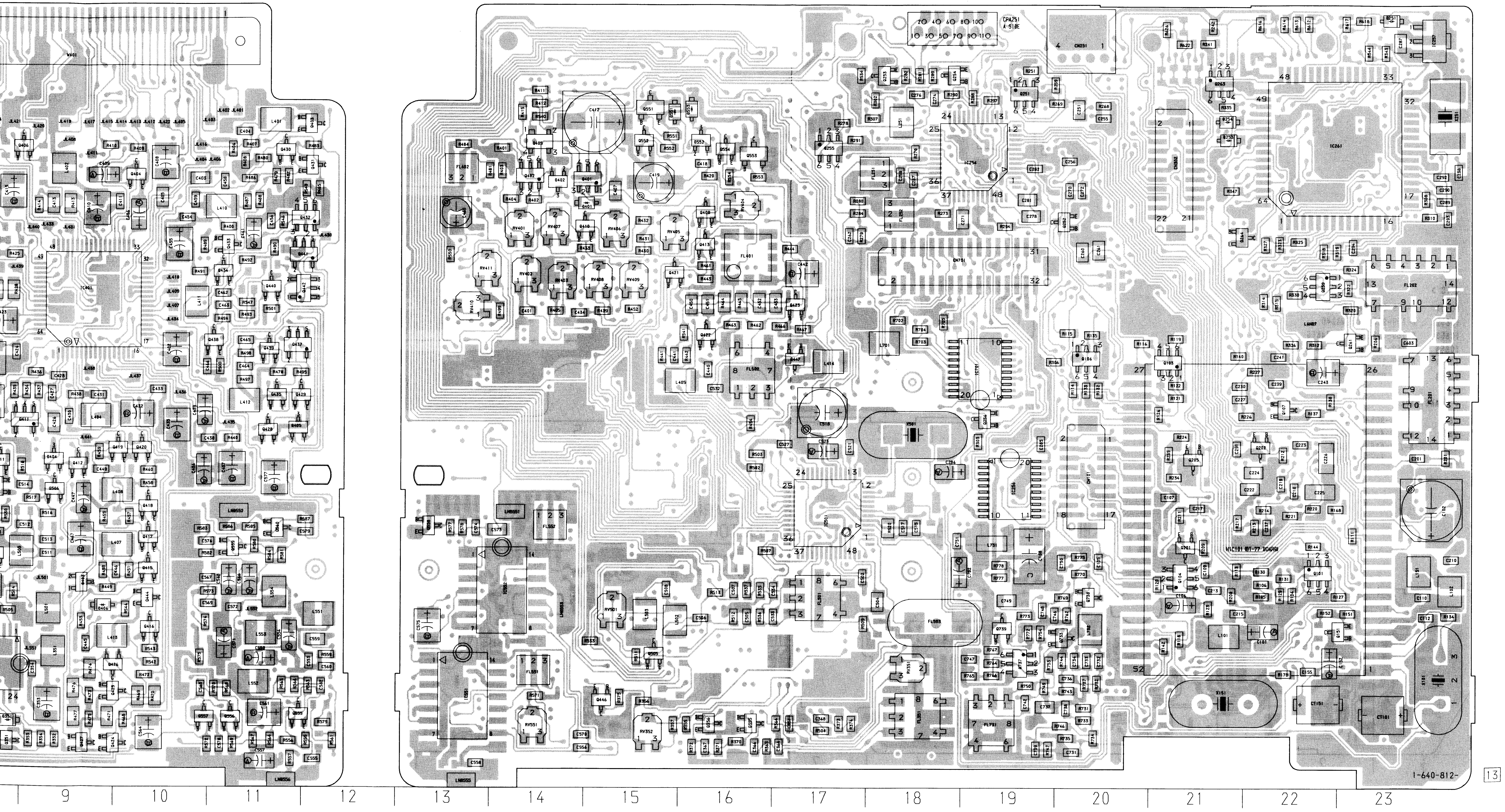
VC-106 BOARD (CONDUCTOR SIDE)



VIDEO VIDEO

5-35 2SC4081-R
0-59 IMX2
5-35 2SC4081-R

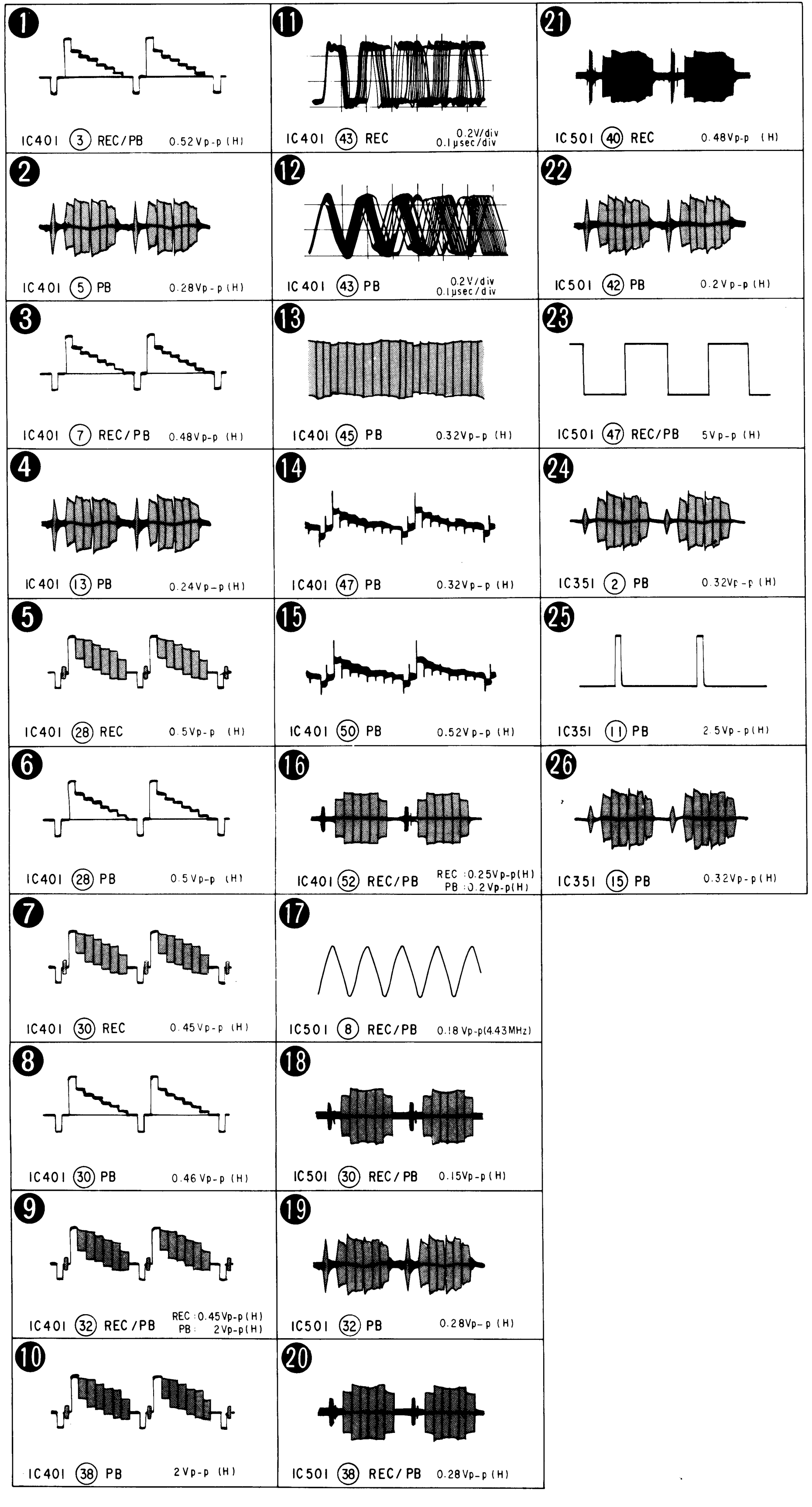
VC-106 BOARD (COMPONENT SIDE)


9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
1-640-812-
13
MIC101 (B1-77 BOARD)
CPA251 A SIDE

VC-106 (VIDEO) SCHEMATIC DIAGRAM

—Ref. No. VC-106 BOARD : 1000 series—

VC-106 BOARD (VIDEO BLOCK)



❶ IC401 ③ REC/PB 0.52Vp-p (H)

❷ IC401 ⑤ PB 0.28Vp-p (H)

❸ IC401 ⑦ REC/PB 0.48Vp-p (H)

❹ IC401 ⑬ PB 0.24Vp-p (H)

❺ IC401 ㉘ REC 0.5Vp-p (H)

❻ IC401 ㉘ PB 0.5Vp-p (H)

❼ IC401 ㉚ REC 0.45Vp-p (H)

❽ IC401 ㉚ PB 0.46Vp-p (H)

❾ IC401 ㉜ REC/PB REC: 0.45Vp-p(H) PB: 2Vp-p(H)

❿ IC401 ㊳ PB 2Vp-p (H)

⓫ IC401 ㊸ REC 0.2V/div 0.1μsec/div

⓬ IC401 ㊸ PB 0.2V/div 0.1μsec/div

⓭ IC401 ㊺ PB 0.32Vp-p (H)

⓮ IC401 ㊼ PB 0.32Vp-p (H)

⓯ IC401 (50) PB 0.52Vp-p (H)

⓰ IC401 (52) REC/PB REC: 0.25Vp-p(H) PB: 0.2Vp-p(H)

⓱ IC501 ⑧ REC/PB 0.18Vp-p(4.43MHz)

⓲ IC501 ㉚ REC/PB 0.15Vp-p (H)

⓳ IC501 ㉜ PB 0.28Vp-p (H)

⓴ IC501 ㊳ REC/PB 0.28Vp-p (H)

㉑ IC501 ㊵ REC 0.48Vp-p (H)

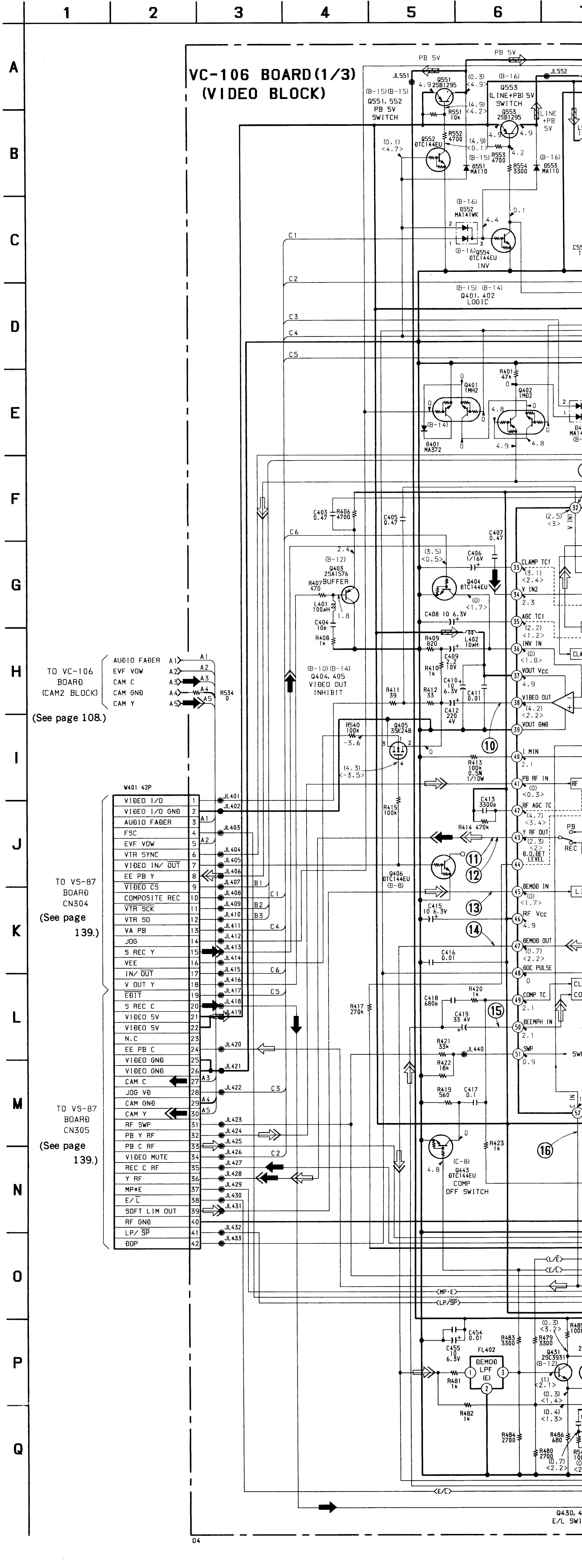
㉒ IC501 ㊷ PB 0.2Vp-p (H)

㉓ IC501 ㊼ REC/PB 5Vp-p (H)

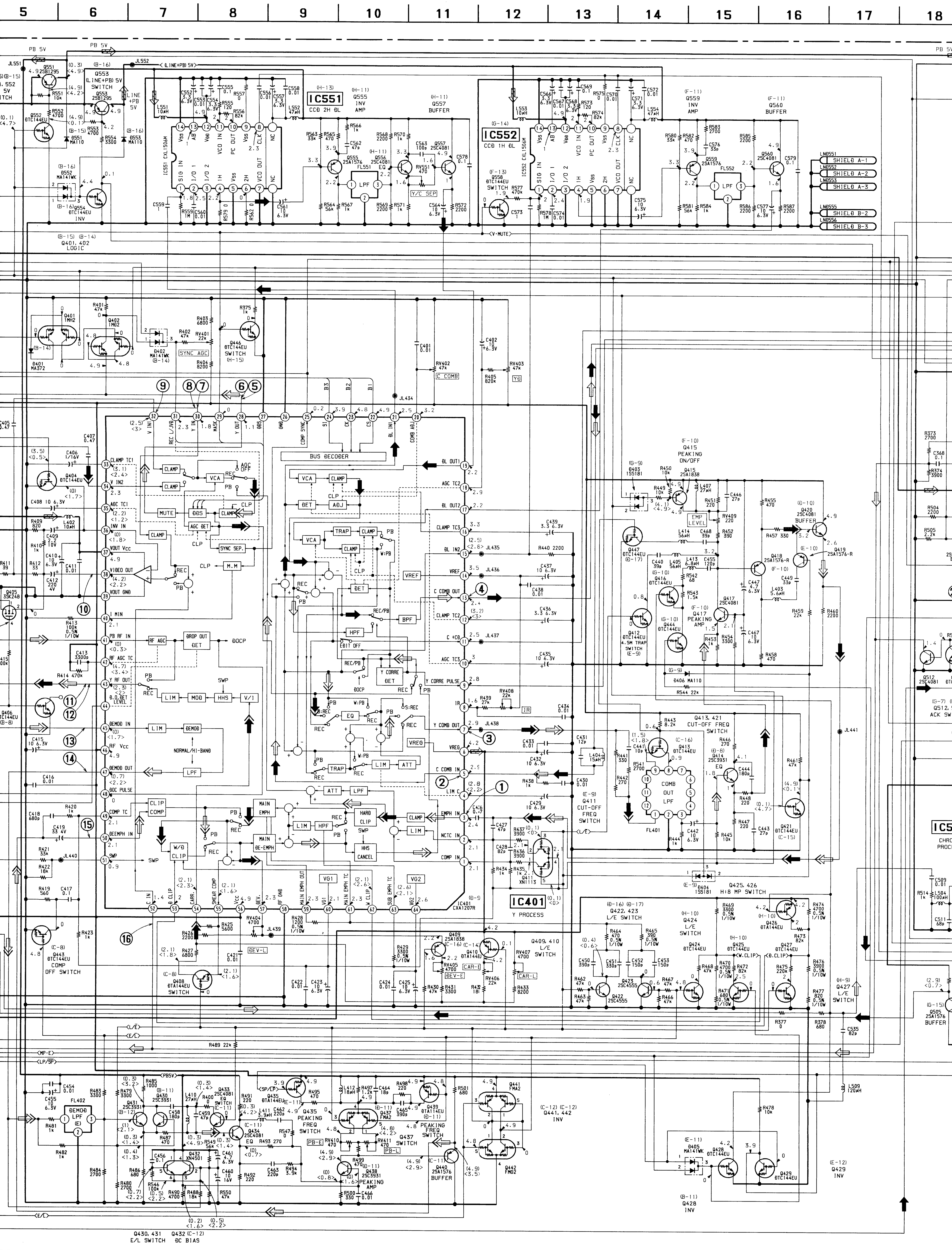
㉔ IC351 ② PB 0.32Vp-p (H)

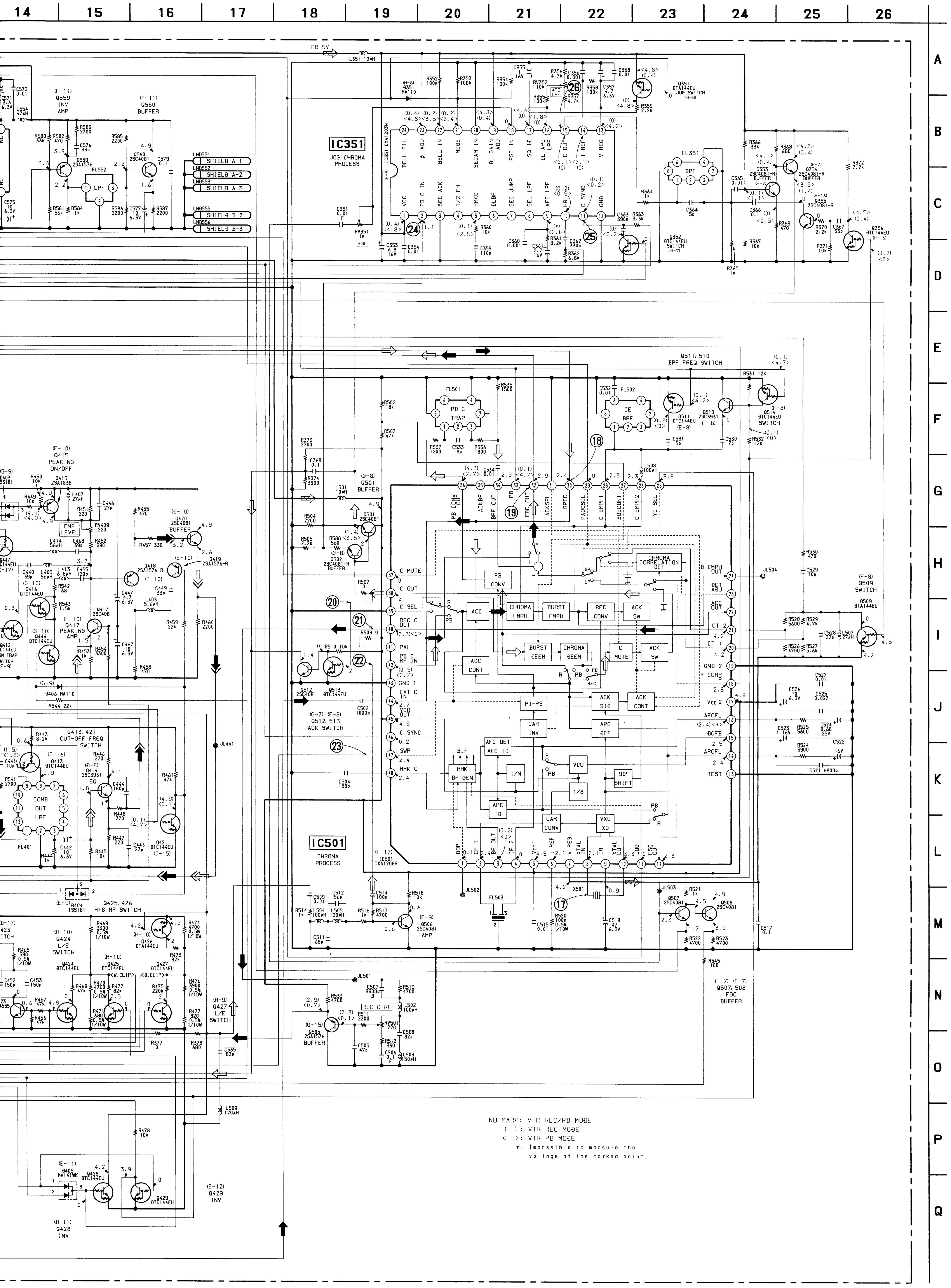
㉕ IC351 ⑪ PB 2.5Vp-p (H)

㉖ IC351 ⑮ PB 0.32Vp-p (H)

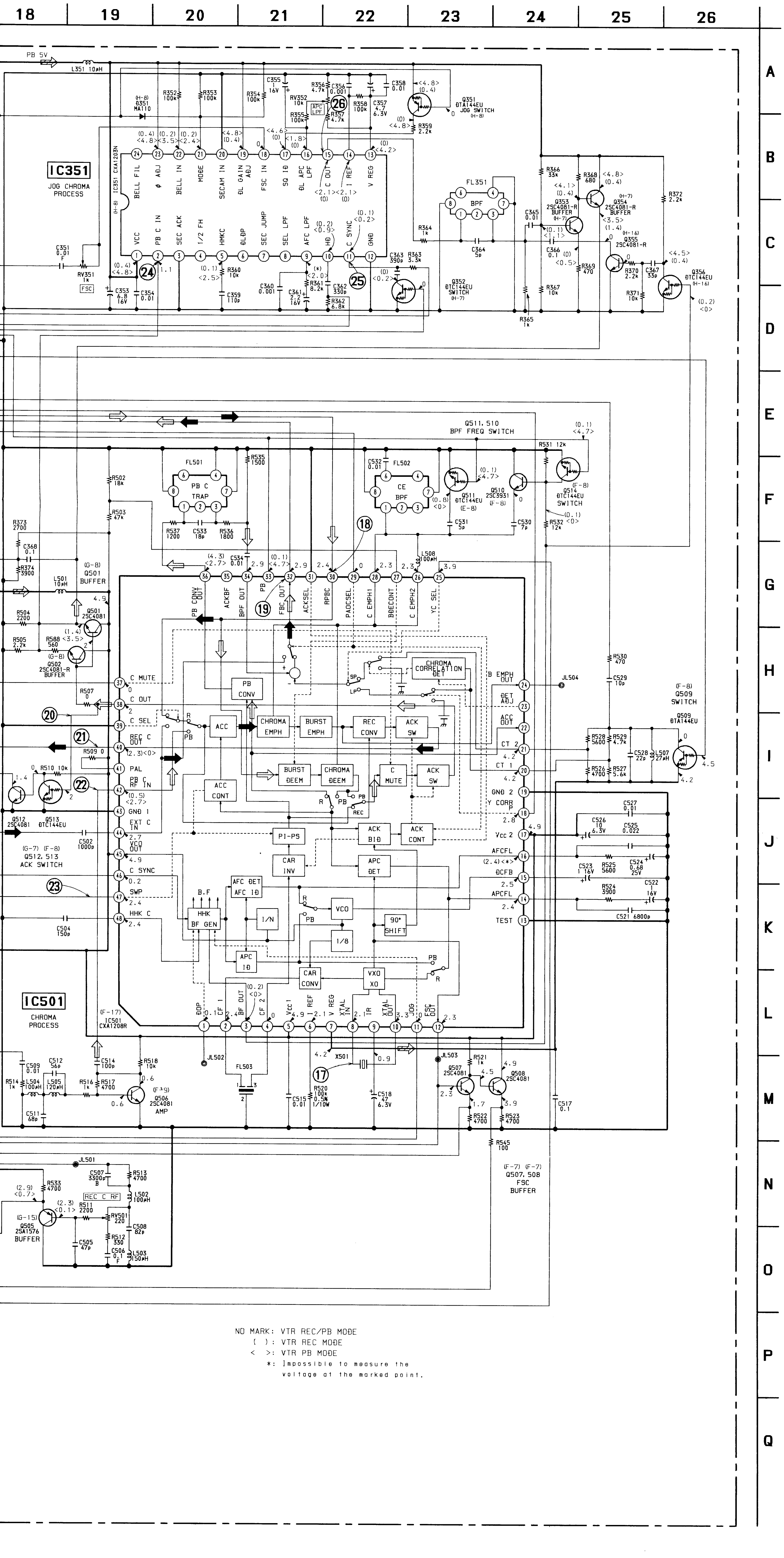


1
2
3
4
5
6
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
VC-106 BOARD(1/3)
(VIDEO BLOCK)
Q551, 552 PB 5V SWITCH
Q553 (LINE+PB) 5V SWITCH
Q552 DTC144EU
Q553 2SB1295
Q551 2SB1295
D551 MA110
D553 MA110
D552 MA141WK
Q554 DTC144EU INV
Q401, 402 LOGIC
Q401 IMH2
Q402 IMD2
D401 MA372
Q403 2SA1576 BUFFER
Q404 DTC144EU
Q404, 405 VIDEO OUT INHIBIT
Q405 3SK248
Q406 DTC144EU
Q443 DTC144EU COMP OFF SWITCH
Q431 2SC3931
FL402 DEMOD LPF (E)
Q430, 4 E/L SWI
TO VC-106 BOARD (CAM2 BLOCK)
(See page 108.)
AUDIO FADER A1
EVF VDW A2
CAM C A3
CAM GND A4
CAM Y A5
TO VS-87 BOARD CN304
(See page 139.)
TO VS-87 BOARD CN305
(See page 139.)
W401 42P
1 VIDEO I/O
2 VIDEO I/O GND
3 AUDIO FADER
4 FSC
5 EVF VDW
6 VTR SYNC
7 VIDEO IN/OUT
8 EE PB Y
9 VIDEO CS
10 COMPOSITE REC
11 VTR SCK
12 VTR SO
13 VA PB
14 JOG
15 S REC Y
16 VEE
17 IN/OUT
18 V OUT Y
19 EDIT
20 S REC C
21 VIDEO 5V
22 VIDEO 5V
23 N.C
24 EE PB C
25 VIDEO GND
26 VIDEO GND
27 CAM C
28 JOG VD
29 CAM GND
30 CAM Y
31 RF SWP
32 PB Y RF
33 PB C RF
34 VIDEO MUTE
35 REC C RF
36 Y RF
37 MP*E
38 E/L
39 SOFT LIM OUT
40 RF GND
41 LP/SP
42 DOP
CLAMP TC1
V IN2
AGC TC1
INV IN
VOUT Vcc
VIDEO OUT
VOUT GND
I MIN
PB RF IN
RF AGC TC
Y RF OUT
D.O.DET LEVEL
DEMOD IN
RF Vcc
DEMOD OUT
DOC PULSE
COMP TC
DEEMPH IN
SWP
PB
REC
<MP·E>
<LP/SP>
<E/L>
04

5
6
7
8
9
10
11
12
13
14
15
16
17
18
PB 5V
(LINE+PB) 5V
Q551 2SB1295
Q553 (LINE+PB) 5V SWITCH
Q553 2SB1295
Q552 DTC144EU
D551 MA110
D553 MA110
D552 MA141WK
Q554 DTC144EU INV
Q401, 402 LOGIC
IC551 CCD 2H DL
IC551 CXL1506M
Q555 INV AMP
Q557 BUFFER
Q555 2SA1576
Q556 2SC4081 EQ
Q557 2SC4081
FL551 LPF
Y/C SEP
IC552 CCD 1H DL
IC552 CXL1506M
Q558 DTC144EU SWITCH
Q559 INV AMP
Q560 BUFFER
Q559 2SA1576
Q560 2SC4081
FL552 LPF
V·MUTE
SHIELD A-1
SHIELD A-2
SHIELD A-3
SHIELD B-2
SHIELD B-3
Q401 IMH2
Q402 IMD2
D401 MA372
D402 MA141WK
Q446 DTC144EU SWITCH
SYNC AGC
C COMB
YD
JL434
BUS DECODER
Q404 DTC144EU
Q405 3SK248
Q406 DTC144EU
Q443 DTC144EU COMP OFF SWITCH
Q408 DTA144EU SWITCH
CLAMP TC1
V IN2
AGC TC1
INV IN
VOUT Vcc
VIDEO OUT
VOUT GND
I MIN
PB RF IN
RF AGC TC
Y RF OUT
D.O.DET LEVEL
DEMOD IN
RF Vcc
DEMOD OUT
DOC PULSE
COMP TC
DEEMPH IN
SWP
C IN
B CLIP
CARR.
SHEAR COMP
Vcc
DEV.
RF GND
MAIN EMPH OUT
VG1
MAIN EMPH TC
W CLIP
SUB EMPH TC
VG2
DL OUT1
AGC TC2
DL OUT2
CLAMP TC3
DL IN2
VREF
C COMB OUT
CLAMP TC2
C +CD
AGC TC3
Y CORRE PULSE
IR
Y COMB OUT
VREG
C COMB IN
LIM C
EMPH IN
NCTC IN
COMP IN
V IN1
REC L/WB
Y IN
MASK
Y OUT
DOS
GND
COMP SYNC
S1
CK
CS
DL IN1
COMB ADJ
CLAMP
VCA
AGC OFF
MUTE
DOS
AGC DET
CLP
SYNC SEP.
M.M
RF AGC
DROP OUT DET
DOCP
LIM
MOD
HHS
V/I
DEMOD
NORMAL/HI-BAND
LPF
CLIP
COMP
W/D CLIP
MAIN EMPH
MAIN DE-EMPH
HPF
HARD CLIP
HHS CANCEL
DET
ADJ
TRAP
BPF
EDIT OFF
Y CORRE DET
EQ
ATT
IC401 Y PROCESS
CXA1207R
JL435
JL436
JL437
JL438
JL439
JL440
DEV-L
Q409 2SA1838
Q410 DTA144EU
Q409, 410 L/E SWITCH
CAR-E
DEV-E
CAR-L
Q411 XN1113
Q411 CUT-OFF FREQ SWITCH
Q415 PEAKING ON/OFF
Q415 2SA1838
D403 1SS181
EMP LEVEL
Q420 2SC4081 BUFFER
Q419 2SA1576-R
Q418 2SA1576-R
Q447 DTC144EU
Q416 DTC144EU
Q412 DTC144EU 4.5M TRAP SWITCH
Q444 DTC144EU
Q417 2SC4081
Q417 PEAKING AMP
D406 MA110
Q413, 421 CUT-OFF FREQ SWITCH
Q413 DTC144EU
Q414 2SC3931 EQ
FL401 COMB OUT LPF
Q421 DTC144EU
D404 1SS181
Q425, 426 HI8 MP SWITCH
Q422, 423 L/E SWITCH
Q424 L/E SWITCH
Q424 DTC144EU
Q425 DTC144EU
Q426 DTA144EU
Q427 DTC144EU
Q422 2SC4555
Q423 2SC4555
W.CLIP
D.CLIP
Q427 L/E SWITCH
Q505 2SA1576 BUFFER
Q512
IC5
CHRO PROC
JL441
L/E
E/L
MP·E
LP/SP
PB5V
FL402 DEMOD LPF
Q431 2SC3931
Q430 2SC3931
Q433 2SC4081
Q433 SWITCH
Q432 XN4501
Q434 2SC4081 EQ
Q435 DTA114EU
Q435 PEAKING FREQ SWITCH
Q437 FMA2
Q437 SWITCH
SP/LP
PB-E
PB-L
Q438 2SC3931
Q438 PEAKING AMP
Q439 DTA114EU
Q439 PEAKING FREQ SWITCH
Q440 2SA1576 BUFFER
Q441 FMA2
Q442 FMG2
Q441, 442 INV
D405 MA141WK
Q428 DTC144EU
Q429 DTC144EU
Q428 INV
Q429 INV
Q430, 431 E/L SWITCH
Q432 DC BIAS


14
15
16
17
18
19
20
21
22
23
24
25
26
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
PB 5V
L351 10μH
IC351
JOG CHROMA PROCESS
IC351 CXA1203N
Q351 DTA144EU JOG SWITCH
BELL FIL
φ ADJ
BELL IN
MODE
SECAM IN
ØL GAIN ADJ
FSC IN
SQ IØ
ØL APC LPF
C OUT
I REF
V REG
VCC
PB C IN
SEC ACK
1/2 FH
HMKC
ØLØP
SEC JUMP
SEL LPF
AFC LPF
HD
C SYNC
GND
RV351 FSC
FL351 BPF
Q353 2SC4081-R BUFFER
Q354 2SC4081-R BUFFER
Q355 2SC4081-R
Q352 DTC144EU SWITCH
Q356 DTC144EU
(F-11) Q559 INV AMP
(F-11) Q560 BUFFER
Q559 2SA1576
Q560 2SC4081
FL552 LPF
SHIELD A-1
SHIELD A-2
SHIELD A-3
SHIELD B-2
SHIELD B-3
(F-10) Q415 PEAKING ON/OFF
Q415 2SA1838
EMP LEVEL
(G-10) Q420 2SC4081 BUFFER
Q418 2SA1576-R
Q419 2SA1576-R
(F-10) Q417 PEAKING AMP
Q417 2SC4081
Q416 DTC144EU
Q444 DTC144EU
Q406 MA110
Q413, 421 CUT-OFF FREQ SWITCH
Q414 2SC3931 EQ
Q421 DTC144EU
COMB OUT LPF
FL401
Q404 1SS181
Q425, 426 HI8 MP SWITCH
Q426 DTA144EU
Q424 L/E SWITCH
Q424 DTC144EU
Q425 DTC144EU
Q427 DTC144EU
W.CLIP
B.CLIP
(H-9) Q427 L/E SWITCH
JL441
L509 120μH
Q405 MA141WK
Q428 DTC144EU
Q429 DTC144EU
(E-12) Q429 INV
(B-11) Q428 INV
Q511, 510 BPF FREQ SWITCH
FL501 PB C TRAP
FL502 CE BPF
Q511 DTC144EU
Q510 2SC3931
Q514 DTC144EU SWITCH
(G-8) Q501 BUFFER
Q501 2SC4081
Q502 2SC4081-R BUFFER
L501 10μH
Q512 2SC4081
Q513 DTC144EU
(G-7) (F-8) Q512, 513 ACK SWITCH
IC501
CHROMA PROCESS
(F-17) IC501 CXA1208R
C MUTE
C OUT
C SEL
REC C OUT
PAL
PB C RF IN
GND 1
EXT C IN
VCO OUT
C SYNC
SWP
HHK C
PB CONV OUT
ACKBF
BPF OUT
PB
FBC OUT
ACKSEL
RPBC
PADCSEL
C EMPH1
BBECONT
C EMPH2
YC SEL
B EMPH OUT
DET ADJ
ACC OUT
CT 2
CT 1
GND 2
Y CORR P
Vcc 2
AFCFL
ØCFB
APCFL
TEST
ØDP
CF 1
BF OUT
CF 2
Vcc1
REF
V REG
XTAL IN
TR
XTAL OUT
DG
OSC
PB CONV
ACC
CHROMA EMPH
BURST EMPH
REC CONV
ACK SW
BURST DEEM
CHROMA DEEM
C MUTE
ACK SW
ACC CONT
CHROMA CORRELATION DET
P1-PS
ACK BIØ
ACK CONT
CAR INV
APC DET
AFC DET
AFC 1Ø
VCO
HHK BF GEN
1/N
90° SHIFT
1/8
APC 1Ø
CAR CONV
VXO XO
X501
FL503
JL502
JL503
JL504
JL501
(F-9) Q506 2SC4081 AMP
(F-8) Q509 SWITCH
Q509 DTA144EU
Q507 2SC4081
Q508 2SC4081
(F-7) (F-7) Q507, 508 FSC BUFFER
REC C RF
(G-15) Q505 2SA1576 BUFFER
L502 100μH
L503 150μH
L508 100μH
L507 27μH

NO MARK: VTR REC/PB MODE
( ): VTR REC MODE
< >: VTR PB MODE
*: Impossible to measure the voltage at the marked point.


18
19
20
21
22
23
24
25
26
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
PB 5V
L351 10μH
IC351
JOG CHROMA PROCESS
IC351 CXA1203N
BELL FIL
φ ADJ
BELL IN
MODE
SECAM IN
DL GAIN ADJ
FSC IN
SQ ID
DL APC LPF
C OUT
I REF
V REG
VCC
PB C IN
SEC ACK
1/2 FH
HHKC
DLDP
SEC JUMP
SEL LPF
AFC LPF
HD
C SYNC
GND
Q351 DTA144EU JOG SWITCH
FL351 BPF
Q353 2SC4081-R BUFFER
Q354 2SC4081-R BUFFER
Q355 2SC4081-R
Q356 DTC144EU
Q352 DTC144EU SWITCH
RV351
RV352
Q511, 510 BPF FREQ SWITCH
FL501 PB C TRAP
FL502 CE BPF
Q511 DTC144EU
Q510 2SC3931
Q514 DTC144EU SWITCH
Q501 2SC4081 BUFFER
Q502 2SC4081-R BUFFER
Q512, 513 ACK SWITCH
Q512 2SC4081
Q513 DTC144EU
Q509 DTA144EU SWITCH
IC501
CHROMA PROCESS
IC501 CXA1208R
PB CONV OUT
ACKBF
BPF OUT
PB FBC OUT
ACKSEL
RPBC
PADCSEL
C EMPH1
BBECONT
C EMPH2
YC SEL
C MUTE
C OUT
C SEL
REC C OUT
PAL
PB C RF IN
GND 1
EXT C IN
VCO OUT
C SYNC
SWP
HHK C
B EMPH OUT
DET ADJ
ACC OUT
CT 2
CT 1
GND 2
Y CORR
Vcc 2
AFCFL
DCFB
APCFL
TEST
PB CONV
ACC
CHROMA EMPH
BURST EMPH
REC CONV
ACK SW
CHROMA CORRELATION DET
BURST DEEM
CHROMA DEEM
C MUTE
ACK SW
ACC CONT
PI-PS
ACK BID
ACK CONT
CAR INV
APC DET
AFC DET AFC ID
B.F
HHK BF GEN
1/N
VCO
90° SHIFT
1/8
APC ID
CAR CONV
VXO XO
DDP
CF 1
BF OUT
CF 2
Vcc1
REF
V REG
XTAL IN
I R
XTAL OUT
DG
FSC OUT
X501
FL503
JL501
JL502
JL503
JL504
Q506 2SC4081 AMP
Q507 2SC4081
Q508 2SC4081
Q507, 508 FSC BUFFER
Q505 2SA1576 BUFFER
REC C RF
RV501 220

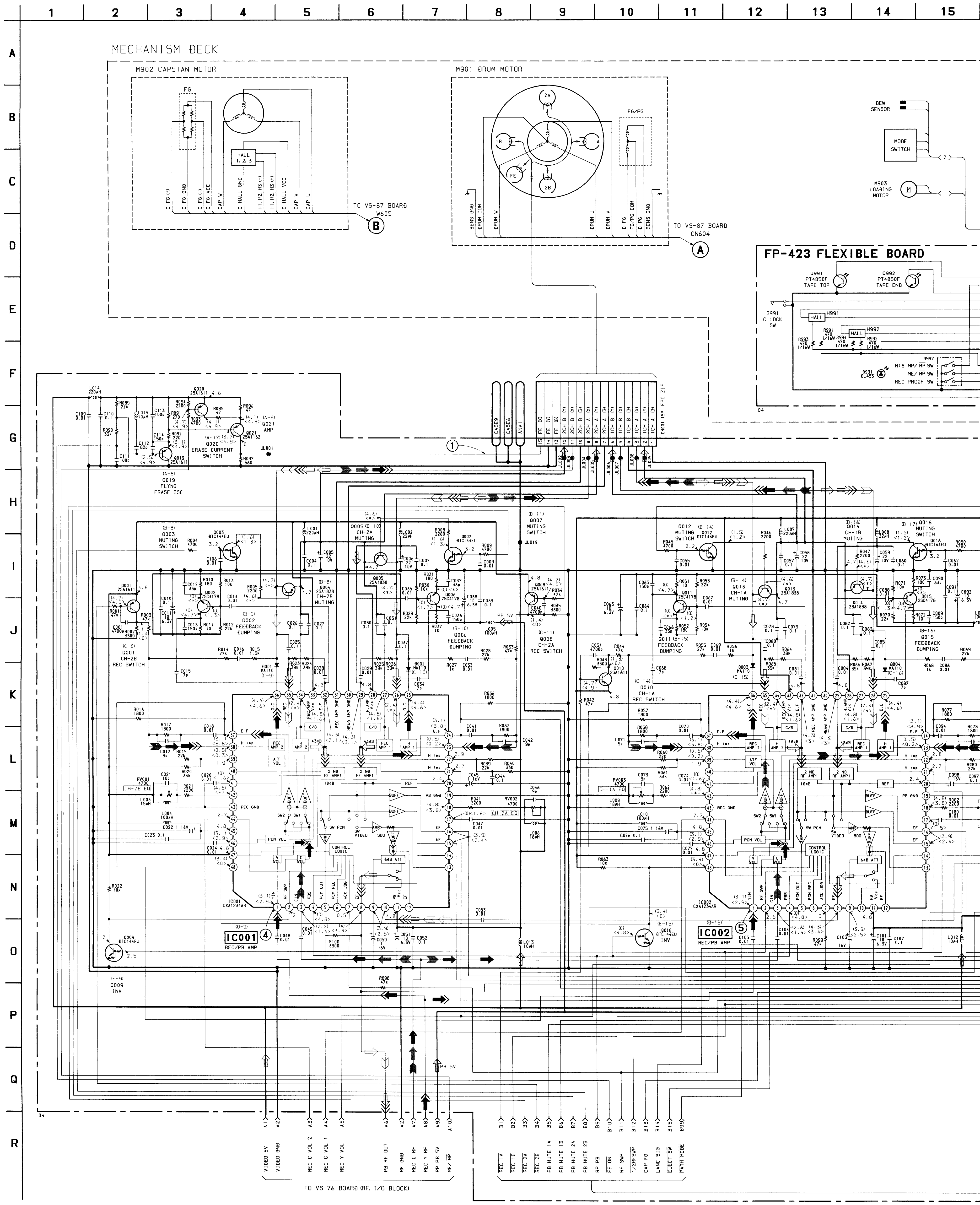
NO MARK: VTR REC/PB MODE
( ): VTR REC MODE
< >: VTR PB MODE
*: Impossible to measure the voltage at the marked point.

• Signal path

	VIDEO Signal		
	CHROMA	Y	Y/CHROMA
REC	➡	➡»	➡»»
PB	⇨	⇨»	⇨»»

FP-423 (TAPE TOP/END SENSOR, TAPE SELECT) VS-87 (HEAD AMP, SERVO, SYSTEM CONTROL) SCHEMATIC DIAGRAM

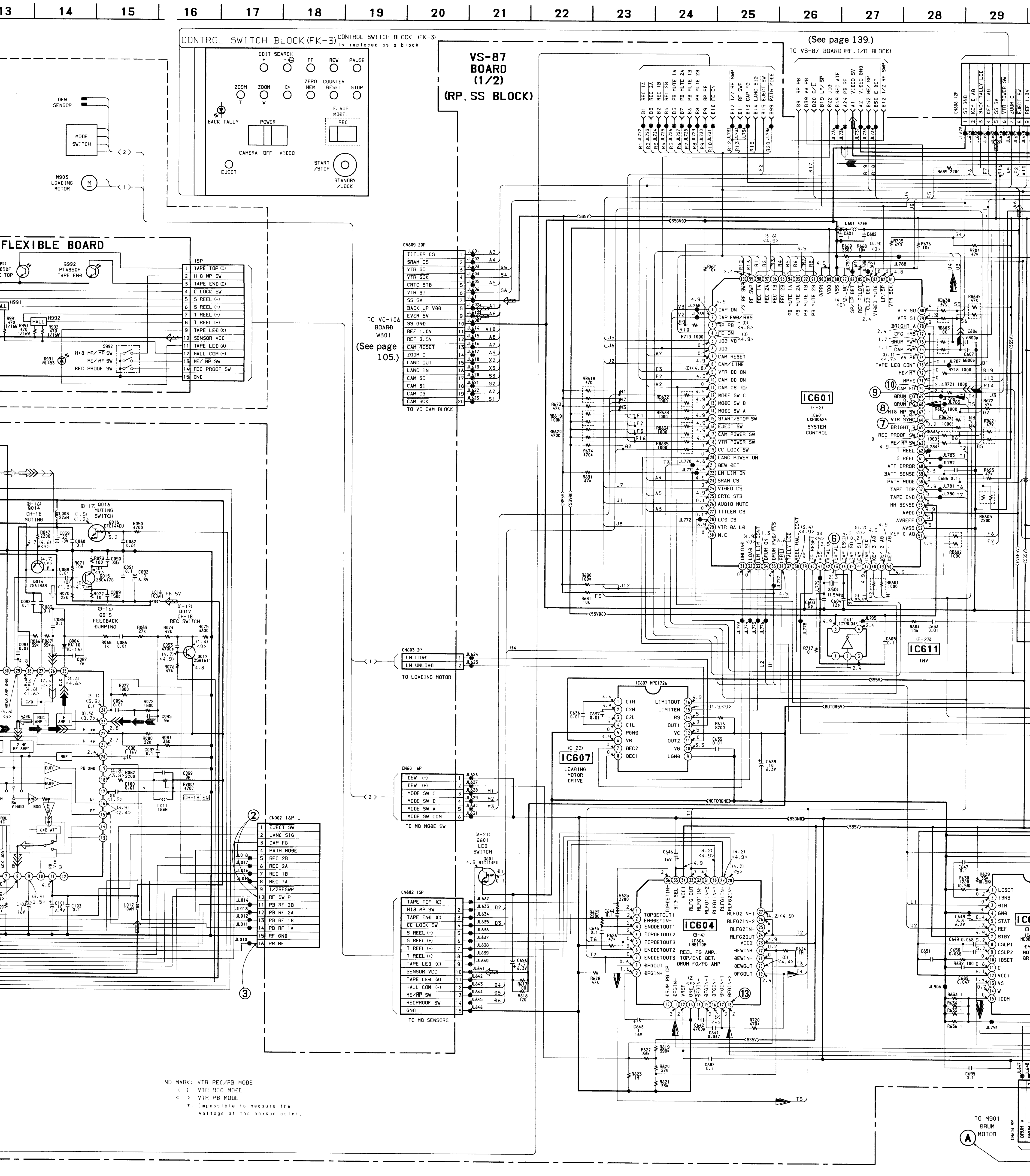
—Ref. No. VS-87 BOARD : 5000 series, FP-423 BOARD : 8000 series—



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
MECHANISM DECK
M902 CAPSTAN MOTOR
FG
HALL 1, 2, 3
C FG (+)
C FG GND
C FG (-)
C FG VCC
CAP W
C HALL GND
H1, H2, H3 (-)
H1, H2, H3 (+)
C HALL VCC
CAP V
CAP U
TO VS-87 BOARD W605
B
M901 DRUM MOTOR
2A
1B
1A
FE
2B
FG/PG
SENS GND
DRUM COM
DRUM W
DRUM U
DRUM V
D FG
FG/PG COM
D PG
SENS GND
TO VS-87 BOARD CN604
A
DEW SENSOR
MODE SWITCH
M903 LOADING MOTOR
FP-423 FLEXIBLE BOARD
Q991 PT4850F TAPE TOP
Q992 PT4850F TAPE END
S991 C LOCK SW
H991
H992
S992
H18 MP/MP SW
ME/MP SW
REC PROOF SW
D991 GL453
CN001 15P FPC 21F
Q020 2SA1611
Q021 2SA1162 AMP
Q020 ERASE CURRENT SWITCH
Q019 2SA1611
Q019 FLYNG ERASE OSC
Q003 DTC144EU MUTING SWITCH
Q001 2SA1611
Q001 CH-2B REC SWITCH
Q002 2SC4178
Q002 FEEDBACK DUMPING
Q004 2SA1838 CH-2B MUTING
Q005 CH-2A MUTING
Q006 2SC4178
Q006 FEEDBACK DUMPING
Q007 DTC144EU
Q007 MUTING SWITCH
Q008 2SA1611
Q008 CH-2A REC SWITCH
CH-2B EQ
CH-2A EQ
IC001 CXA1234AR
IC001 ④ REC/PB AMP
Q009 DTC144EU
Q009 INV
Q012 MUTING SWITCH
Q011 2SC4178
Q011 FEEDBACK DUMPING
Q013 2SA1838
Q013 CH-1A MUTING
Q010 2SA1611
Q010 CH-1A REC SWITCH
CH-1A EQ
Q014 CH-1B MUTING
Q016 MUTING SWITCH
Q014 2SA1838
Q015 2SC4178
Q015 FEEDBACK DUMPING
IC002 CXA1234AR
IC002 ⑤ REC/PB AMP
Q018 DTC144EU INV
REC AMP 2
H AMP 2
REC AMP 1
H AMP 1
ATF VOL
2 ND RF AMP1
REF
BUFF
SW PCM
SW VIDEO
PCM VOL
CONTROL LOGIC
64B ATT
C/O
REC GND
PB GND
HEAD AMP GND
RF SWP
PBS
PCM OUT
PCM REC
ACK
JOG
PB Vcc
EF
PB 5V
A1 VIDEO 5V
A2 VIDEO GND
A3 REC C VOL 2
A4 REC C VOL 1
A5 REC Y VOL
A6 PB RF OUT
A2 RF GND
A7 REC C RF
A8 REC Y RF
A9 RP PB 5V
A10 ME/MP
B1 REC 1A
B2 REC 1B
B3 REC 2A
B4 REC 2B
B5 PB MUTE 1A
B6 PB MUTE 1B
B7 PB MUTE 2A
B8 PB MUTE 2B
B9 RP PB
B10 FE ON
B11 RF SWP
B12 1/2RFSWP
B13 CAP FO
B14 LANC SIG
B15 EJECT SW
B99 PATH MODE
TO VS-76 BOARD (RF, I/O BLOCK)

(See page 137.)

Note:


13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
CONTROL SWITCH BLOCK (FK-3)
CONTROL SWITCH BLOCK (FK-3) is replaced as a block
EDIT SEARCH
FF
REW
PAUSE
ZOOM T
ZOOM W
ZERO MEM
COUNTER RESET
STOP
BACK TALLY
POWER
CAMERA OFF VIDEO
E, AUS MODEL
REC
EJECT
START /STOP
STANDBY /LOCK
DEW SENSOR
MODE SWITCH
M903 LOADING MOTOR
FLEXIBLE BOARD
Q992 PT4850F TAPE END
H18 MP/MP SW
ME/MP SW
REC PROOF SW
VS-87 BOARD (1/2) (RP, SS BLOCK)
(See page 139.)
TO VS-87 BOARD (RF, I/O BLOCK)
TO VC-106 BOARD W301
(See page 105.)
CN609 20P
TO VC CAM BLOCK
CN603 2P
LM LOAD
LM UNLOAD
TO LOADING MOTOR
CN601 6P
TO MD MODE SW
CN602 15P
TO MD SENSORS
CN002 16P
IC601 CXP80624 SYSTEM CONTROL
IC611 TC7SU04F INV
IC607 MPC1726 LOADING MOTOR DRIVE
IC604 LB8110M REEL FG AMP, TOP/END DET, DRUM FG/PG AMP
Q601 LED SWITCH
Q016 MUTING SWITCH
Q014 CH-1B MUTING
Q015 FEEDBACK DUMPING
Q017 CH-1B REC SWITCH
TO M901 DRUM MOTOR
CN604 9P
CN606 12P

NO MARK: VTR REC/PB MODE
( ): VTR REC MODE
< >: VTR PB MODE
*: Impossible to measure the voltage of the marked point.

YSTEM CONTROL　HEAD AMP, SERVO, SYSTEM CONTROL

• Signal path

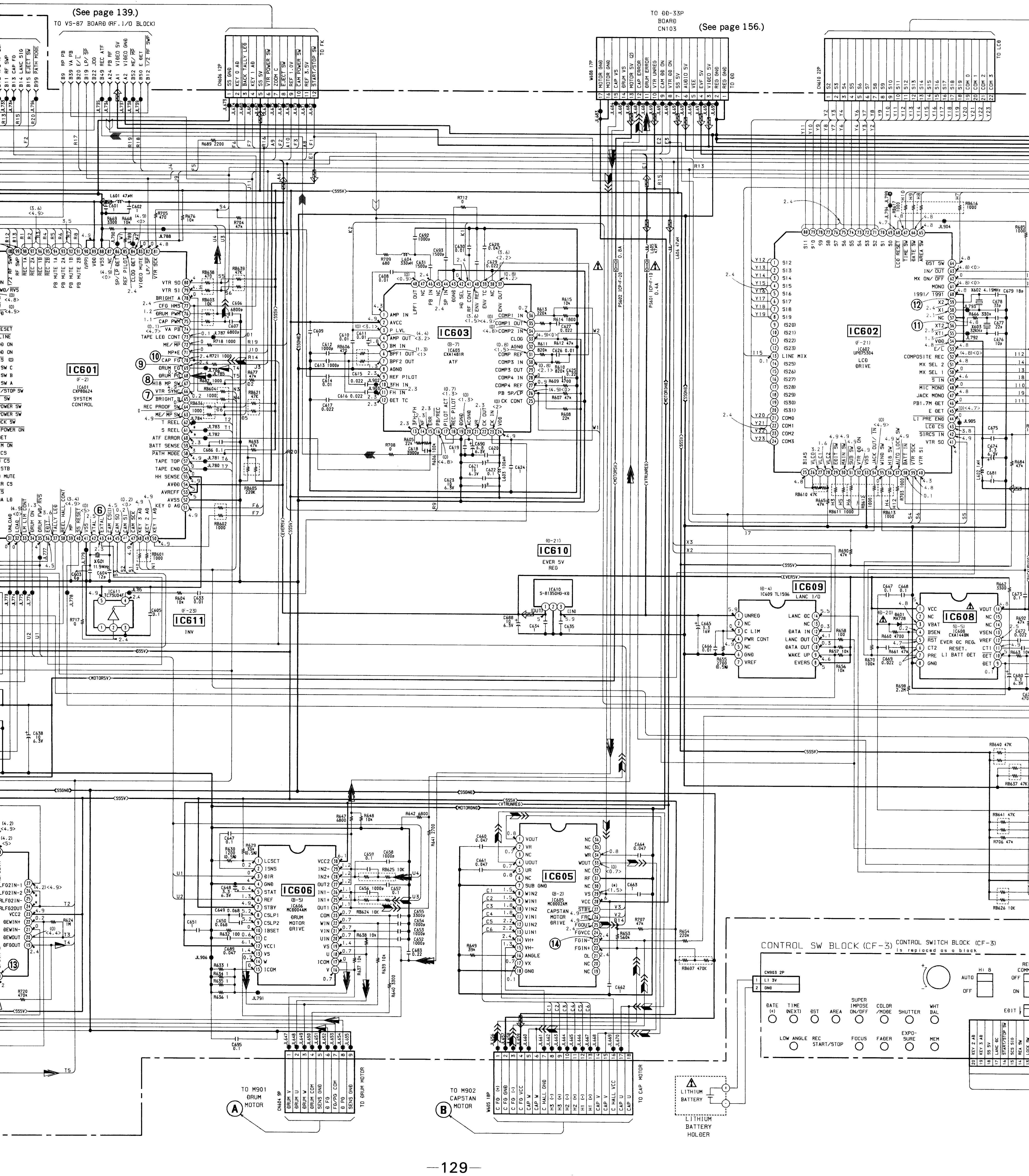
Drum speed servo
Drum phase servo
Drum servo(speed and phase)
Capstan speed servo
Capstan phase servo
Capstan servo(speed and pha
Ref.signal

• Signal path

	VIDEO Signal			AUDIO Signal
	CHROMA	Y	Y/CHROMA	
REC	➡	➡➡	➡➡➡	➡
PB	⇨	⇨⇨	⇨⇨⇨	⇨

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41


(See page 139.)
TO VS-67 BOARD (RF, I/O BLOCK)
TO FK
TO DD-33P BOARD CN103
(See page 156.)
TO LCD
IC601 (F-2) IC601 CXP80624 SYSTEM CONTROL
IC603 (B-7) IC603 CXA1481R ATF
IC602 (F-21) IC602 UPD75304 LCD DRIVE
IC610 (D-21) EVER 5V REG
IC609 (D-4) IC609 TL1596 LANC I/O
IC608 (E-5) IC608 CXA1448N EVER DC REG. RESET. LI BATT DET
IC611 (F-23) INV
IC606 (B-5) IC606 MC0004AM DRUM MOTOR DRIVE
IC605 (B-2) IC605 MC0002AM CAPSTAN MOTOR DRIVE
TO M901 DRUM MOTOR
TO M902 CAPSTAN MOTOR
LITHIUM BATTERY
LITHIUM BATTERY HOLDER
CONTROL SW BLOCK (CF-3)
CONTROL SWITCH BLOCK (CF-3) is replaced as a block
DATE (+) TIME (NEXT) DST AREA SUPER IMPOSE ON/OFF COLOR /MODE SHUTTER WHT BAL
LOW ANGLE REC START/STOP FOCUS FADER EXPO-SURE MEM
AUTO OFF ON EDIT

HEAD AMP, SERVO, SYSTEM CONTROL HEAD AMP, SERVO,

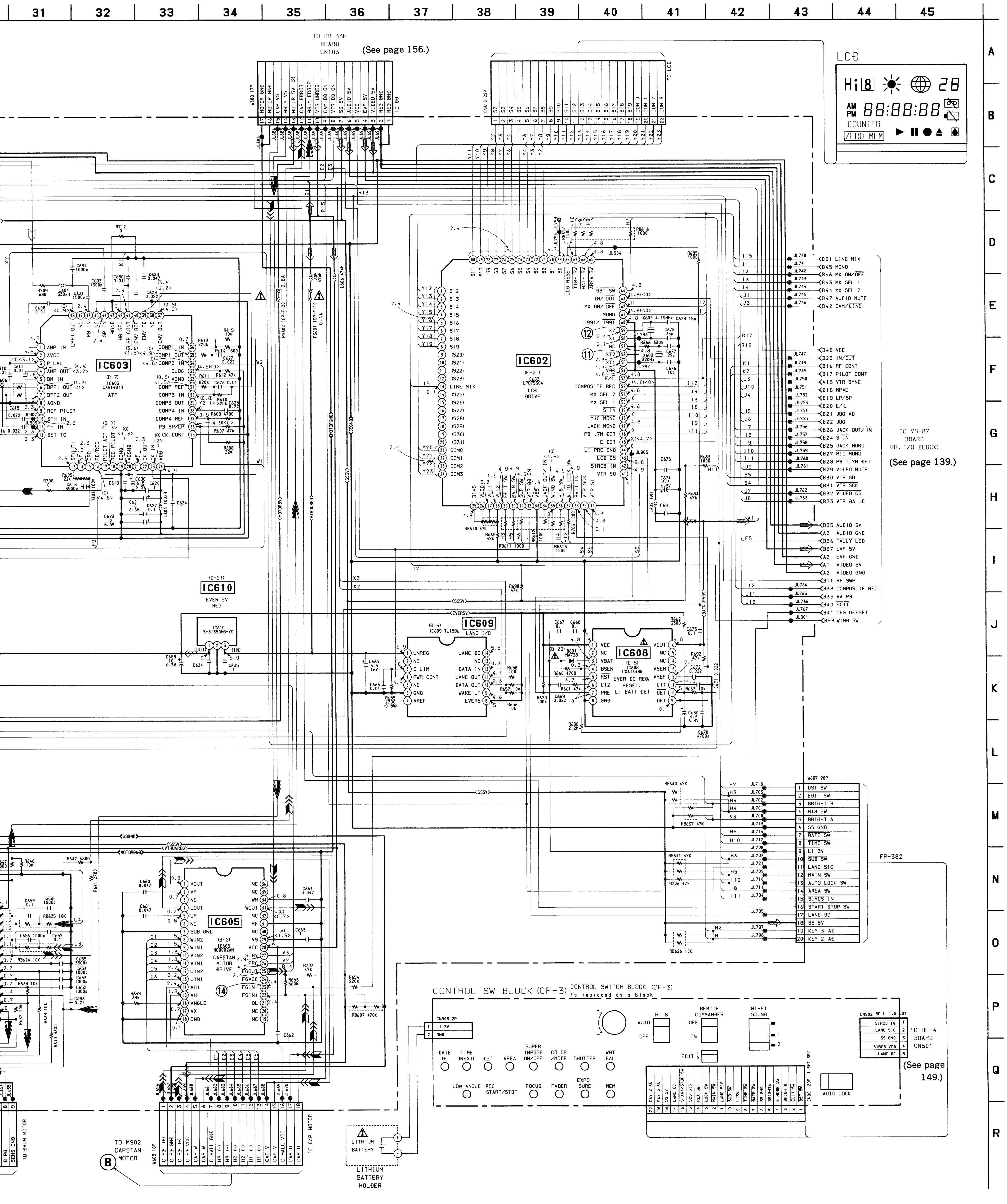
• Signal path

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		▷▷	
Drum servo(speed and phase)		▷▷▷	
Capstan speed servo		▷	
Capstan phase servo	▶▶	▷▷	▷▷
Capstan servo(speed and phase)		▷▷▷	
Ref.signal	▶	▷	▷

• Signal path

	VIDEO Signal			AUDIO Signal
	CHROMA	Y	Y/CHROMA	
REC	➡	➡➡	➡➡➡	➡
PB	⇨	⇨⇨	⇨⇨⇨	⇨

nents identified by mark ⚠ or dotted
ark ⚠ are critical for safety.
y with part number specified.



31 32 33 34 35 36 37 38 39 40 41 42 43 44 45
A B C D E F G H I J K L M N O P Q R
TO DD-33P BOARD CN103
(See page 156.)
TO LCD
LCD
Hi8
28
AM PM 88:88:88
COUNTER
ZERO MEM
IC603
CXA1481R
ATF
IC602
UPD75304
LCD DRIVE
IC610
EVER 5V REG
S-81350HG-KD
IC609
TL1596
LANC I/O
IC608
CXA1448N
EVER DC REG, RESET, LI BATT DET
IC605
MC0002AM
CAPSTAN MOTOR DRIVE
TO VS-87 BOARD (RF, I/O BLOCK)
(See page 139.)
FP-382
CONTROL SW BLOCK (CF-3)
CONTROL SWITCH BLOCK (CF-3) is replaced as a block
Hi 8
AUTO
OFF
REMOTE COMMANDER
OFF
ON
HI-FI SOUND
DATE (+)
TIME (NEXT)
DST
AREA
SUPER IMPOSE ON/OFF
COLOR /MODE
SHUTTER
WHT BAL
LOW ANGLE
REC START/STOP
FOCUS
FADER
EXPO-SURE
MEM
EDIT
AUTO LOCK
TO HL-4 BOARD CN501
(See page 149.)
LITHIUM BATTERY
LITHIUM BATTERY HOLDER
TO M902 CAPSTAN MOTOR
TO CAP MOTOR
TO DRUM MOTOR
B

HEAD AMP, SERVO, SYSTEM CONTROL **HEAD AMP, SERVO, SYSTEM CONTROL**

FP-423 (TAPE TOP/END SENSOR, TAPE SELECT) VS-87 (HEAD AMP, SERVO, SYSTEM CONTROL) PRINTED WIRING BOARDS

—Ref. No. VS-87 BOARD : 5000 series, FP-423 BOARD : 8000 series—

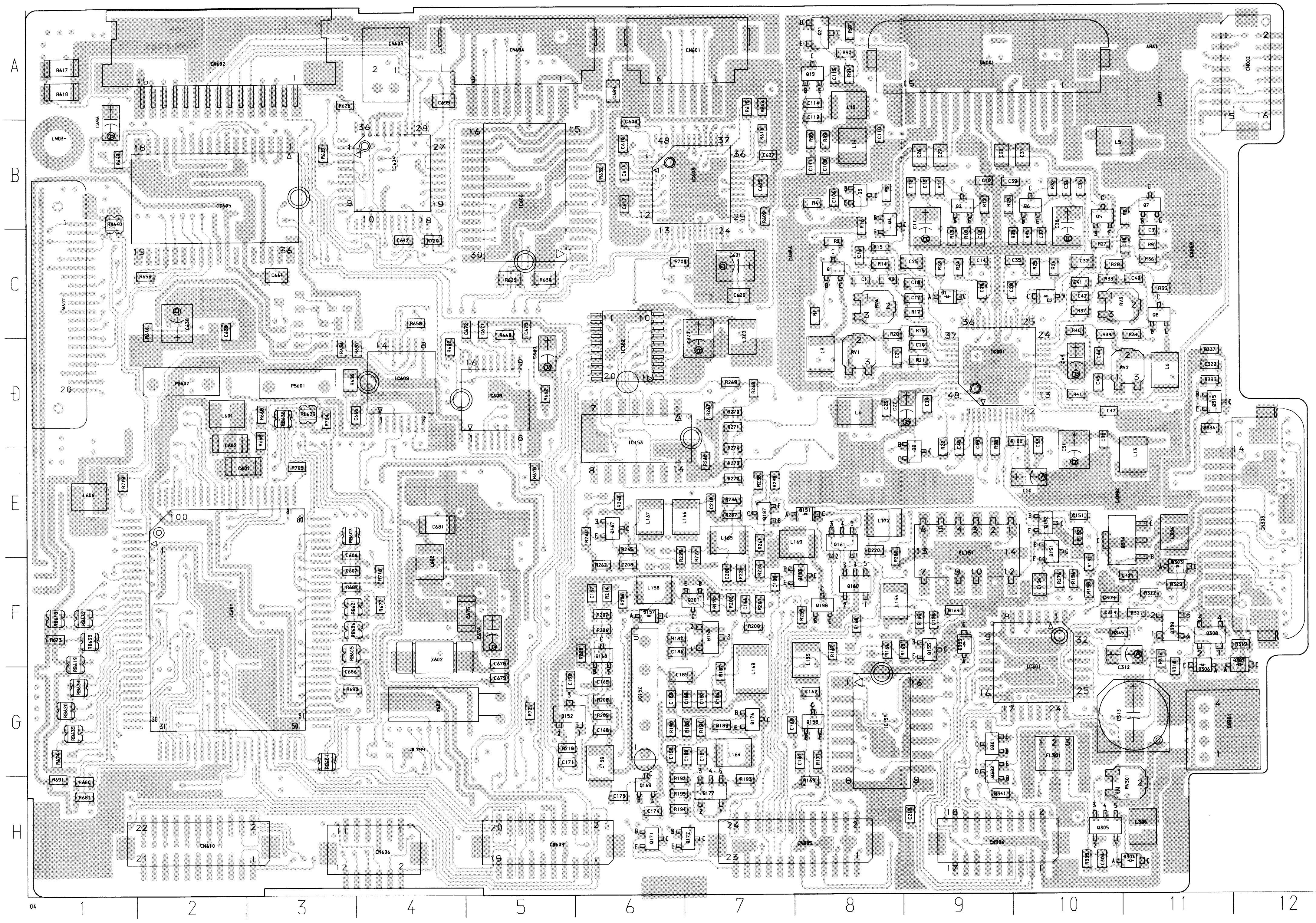
< DIODE >

D001	8-719-404-46	MA110
D002	8-719-404-46	MA110
D003	8-719-404-46	MA110
D004	8-719-404-46	MA110
D151	8-719-404-46	MA110
D152	8-719-800-76	1SS226
D153	8-719-800-76	1SS226
D154	8-719-404-46	MA110
D155	8-719-404-46	MA110
D156	8-719-800-76	1SS226
D157	8-719-404-46	MA110
D301	8-719-404-35	MA141WK
D302	8-719-404-46	MA110
D303	8-719-420-14	MA8082-M
D304	8-719-404-46	MA110
D305	8-719-404-46	MA110
D306	8-719-420-14	MA8082-M
D307	8-719-420-14	MA8082-M
D308	8-719-420-14	MA8082-M
D309	8-719-420-14	MA8082-M
D601	• 8-719-421-27	MA728

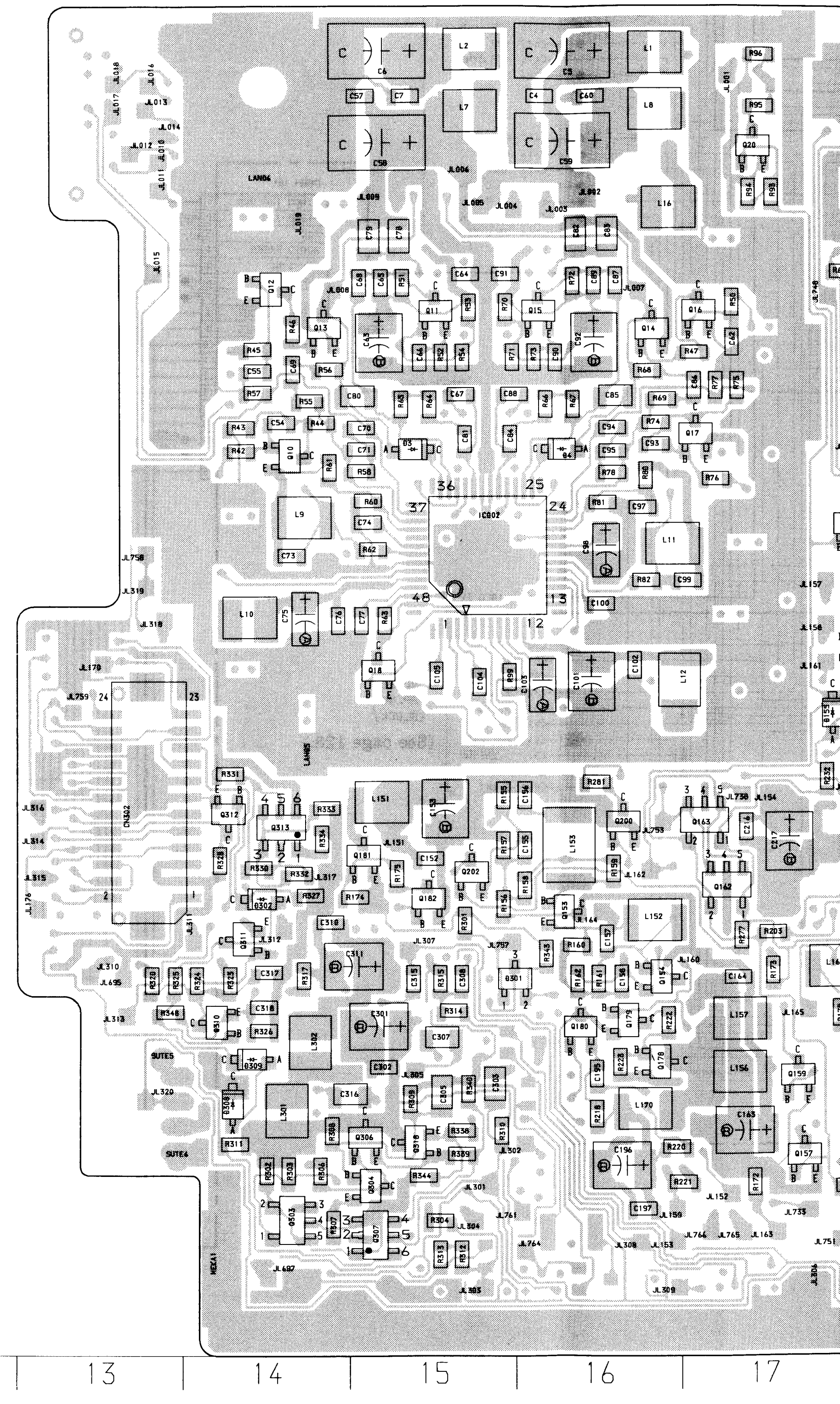
< IC >

IC001	8-752-033-00	CXA1234AR
IC002	8-752-033-00	CXA1234AR
IC151	8-759-998-32	CXD-2107M
IC152	8-759-925-60	BA401
IC153	8-759-509-05	XRU4066BF
IC301	8-759-038-83	MC13400FUEB
IC302	8-759-521-09	MB88346APFV
IC601	8-752-833-59	CXP80624-245Q
IC602	8-759-044-07	uPD75304GF-210-3B9
IC603	8-759-512-42	CXA1481R
IC604	8-759-823-90	LB8110M
IC605	8-759-823-65	MCD002AM
IC606	8-759-057-60	MCD004BM
IC607	8-759-038-98	MPC1726MR2
IC608	• 8-759-511-22	CXA1448N
IC609	8-759-999-02	TL1596CDB
IC610	8-759-512-69	S-81350HG-
IC611	8-759-243-19	TC7SU04F

VS-87 BOARD (COMPONENT SIDE)


A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
8
9
10
11
12
IC001
IC151
IC153
IC301
IC601
IC602
IC603
IC604
IC605
IC606
IC608
IC609
CN001
CN002
CN601
CN602
CN603
CN604
CN605
CN606
CN607
CN609

VS-87 BOARD (CONDUCTOR SIDE)


13
14
15
16
17
IC002

-719-404-46 MA110
-719-404-35 MA141WK
-719-404-46 MA110
-719-420-14 MA8082-M
-719-404-46 MA110
-719-404-46 MA110
-719-420-14 MA8082-M
-719-420-14 MA8082-M
-719-420-14 MA8082-M
-719-420-14 MA8082-M
-719-421-27 MA728

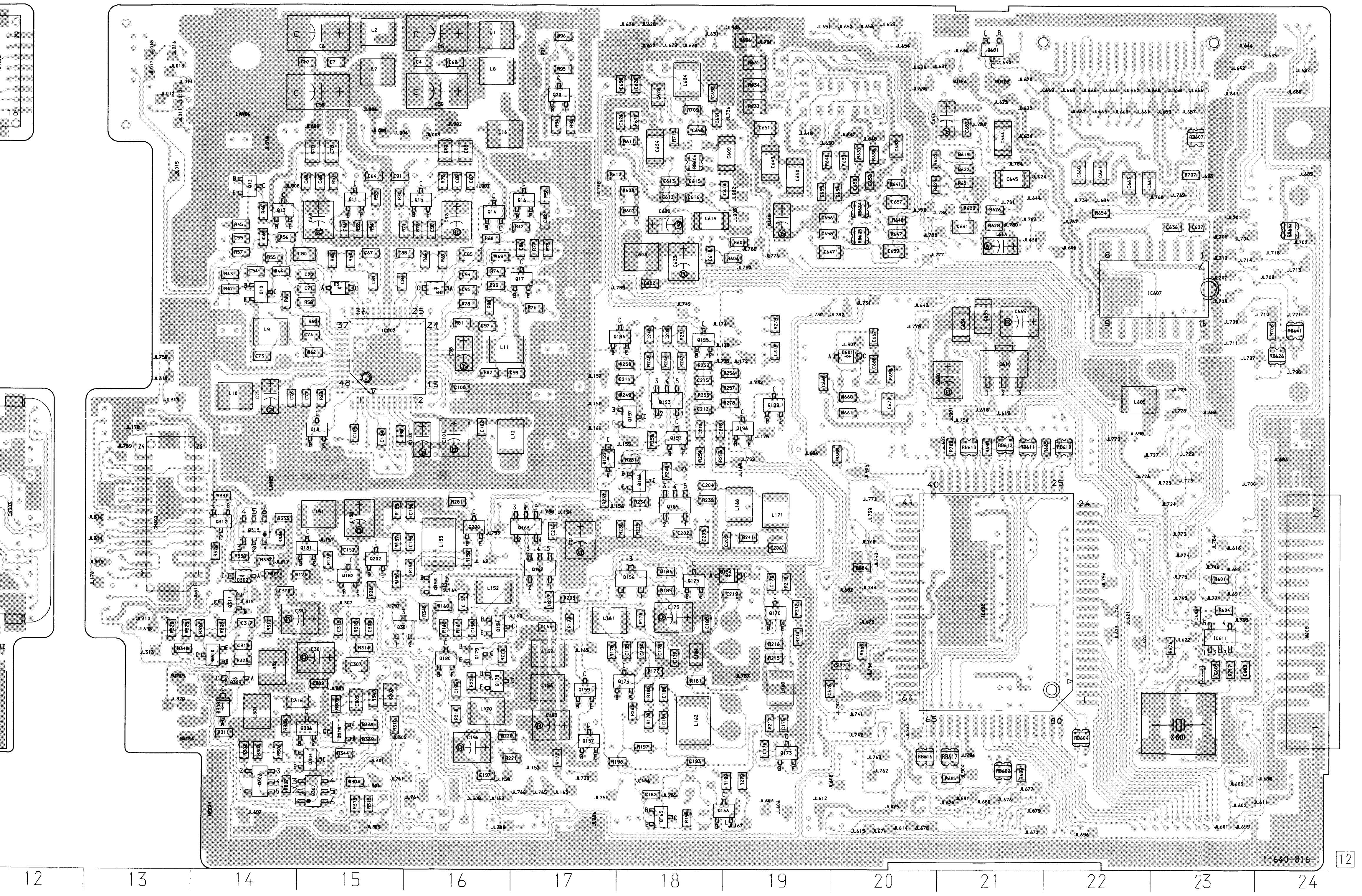
< IC >

IC001	8-752-033-00	CXA1234AR
IC002	8-752-033-00	CXA1234AR
IC151	8-759-998-32	CXD-2107M
IC152	8-759-925-60	BA401
IC153	8-759-509-05	XRU4066BF
IC301	8-759-038-83	MC13400FUEB
IC302	8-759-521-09	MB88346APFV
IC601	8-752-833-59	CXP80624-245Q
IC602	8-759-044-07	uPD75304GF-210-3B9
IC603	8-759-512-42	CXA1481R
IC604	8-759-823-90	LB8110M
IC605	8-759-823-65	MCD002AM
IC606	8-759-057-60	MCD004BM
IC607	8-759-038-98	MPC1726MR2
IC608	• 8-759-511-22	CXA1448N
IC609	8-759-999-02	TL1596CDB
IC610	8-759-512-69	S-81350HG-KD
IC611	8-759-243-19	TC7SU04F

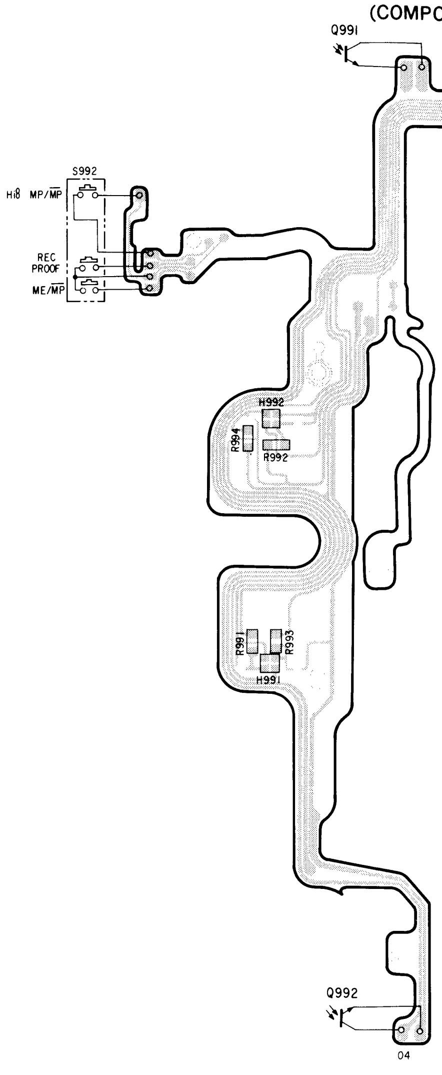
< TRANSISTOR >

Q001	8-729-140-63	2SA1611-M5M6
Q002	8-729-423-52	2SC3931
Q003	8-729-905-18	DTC144EU
Q004	8-729-824-02	2SA1838
Q005	8-729-824-02	2SA1838
Q006	8-729-423-52	2SC3931
Q007	8-729-905-18	DTC144EU
Q008	8-729-140-63	2SA1611-M5M6
Q009	8-729-905-18	DTC144EU
Q010	8-729-140-63	2SA1611-M5M6
Q011	8-729-423-52	2SC3931
Q012	8-729-905-18	DTC144EU
Q013	8-729-824-02	2SA1838
Q014	8-729-824-02	2SA1838
Q015	8-729-423-52	2SC3931
Q016	8-729-905-18	DTC144EU
Q017	8-729-140-63	2SA1611-M5M6
Q018	8-729-905-18	DTC144EU
Q019	8-729-140-63	2SA1611-M5M6
Q020	8-729-140-63	2SA1611-M5M6
Q021	8-729-216-22	2SA1162
Q151	8-729-423-52	2SC3931
Q152	8-729-905-35	2SC4081-R
Q153	8-729-905-35	2SC4081-R
Q154	8-729-423-52	2SC3931
Q155	8-729-140-63	2SA1611-M5M6
Q157	8-729-905-18	DTC144EU
Q158	8-729-905-35	2SC4081-R
Q159	8-729-905-18	DTC144EU
Q160	8-729-904-20	FMA2
Q161	8-729-904-07	FMG2
Q162	8-729-904-20	FMA2
Q163	8-729-904-07	FMG2
Q165	8-729-823-16	2SC4555-5. 6. 7
Q166	8-729-905-18	DTC144EU
Q167	8-729-905-35	2SC4081-R
Q168	8-729-423-52	2SC3931
Q169	8-729-905-12	DTA144EU
Q170	8-729-905-35	2SC4081-R
Q171	8-729-905-18	DTC144EU
Q172	8-729-905-18	DTC144EU
Q173	8-729-905-18	DTC144EU
Q174	8-729-905-35	2SC4081-R
Q175	8-729-905-35	2SC4081-R
Q176	8-729-602-21	2SC4154
Q176	8-729-905-35	2SC4081-R
Q177	8-729-903-10	FMW1
Q178	8-729-140-63	2SA1611-M5M6
Q179	8-729-905-18	DTC144EU
Q180	8-729-140-63	2SA1611-M5M6
Q181	8-729-140-63	2SA1611-M5M6
Q182	8-729-905-18	DTC144EU
Q183	8-729-905-35	2SC4081-R
Q186	8-729-905-35	2SC4081-R
Q187	8-729-905-18	DTC144EU
Q189	8-729-903-10	FMW1
Q192	8-729-905-18	DTC144EU
Q193	8-729-904-20	FMA2
Q194	8-729-905-12	DTA144EU
Q195	8-729-905-35	2SC4081-R
Q196	8-729-905-18	DTC144EU
Q197	8-729-905-35	2SC4081-R
Q198	8-729-140-63	2SA1611-M5M6
Q199	8-729-905-18	DTC144EU
Q200	8-729-905-18	DTC144EU
Q201	8-729-905-35	2SC4081-R
Q202	8-729-905-35	2SC4081-R
Q301	8-729-905-96	DTA114TU
Q302	8-729-905-18	DTC144EU
Q303	8-729-904-07	FMG2
Q304	8-729-423-52	2SC3931
Q305	8-729-421-23	XN1216
Q306	8-729-423-52	2SC3931
Q307	8-729-402-78	XN6401
Q308	8-729-824-05	3SK248
Q309	8-729-824-05	3SK248
Q310	8-729-905-35	2SC4081-R
Q311	8-729-921-58	DTA144TU
Q312	8-729-905-18	DTC144EU
Q313	8-729-402-78	XN6401
Q314	8-729-106-60	2SB1115A
Q315	8-729-905-23	2SA1576-R
Q318	8-729-905-35	2SC4081-R
Q601	8-729-907-00	DTC114EU

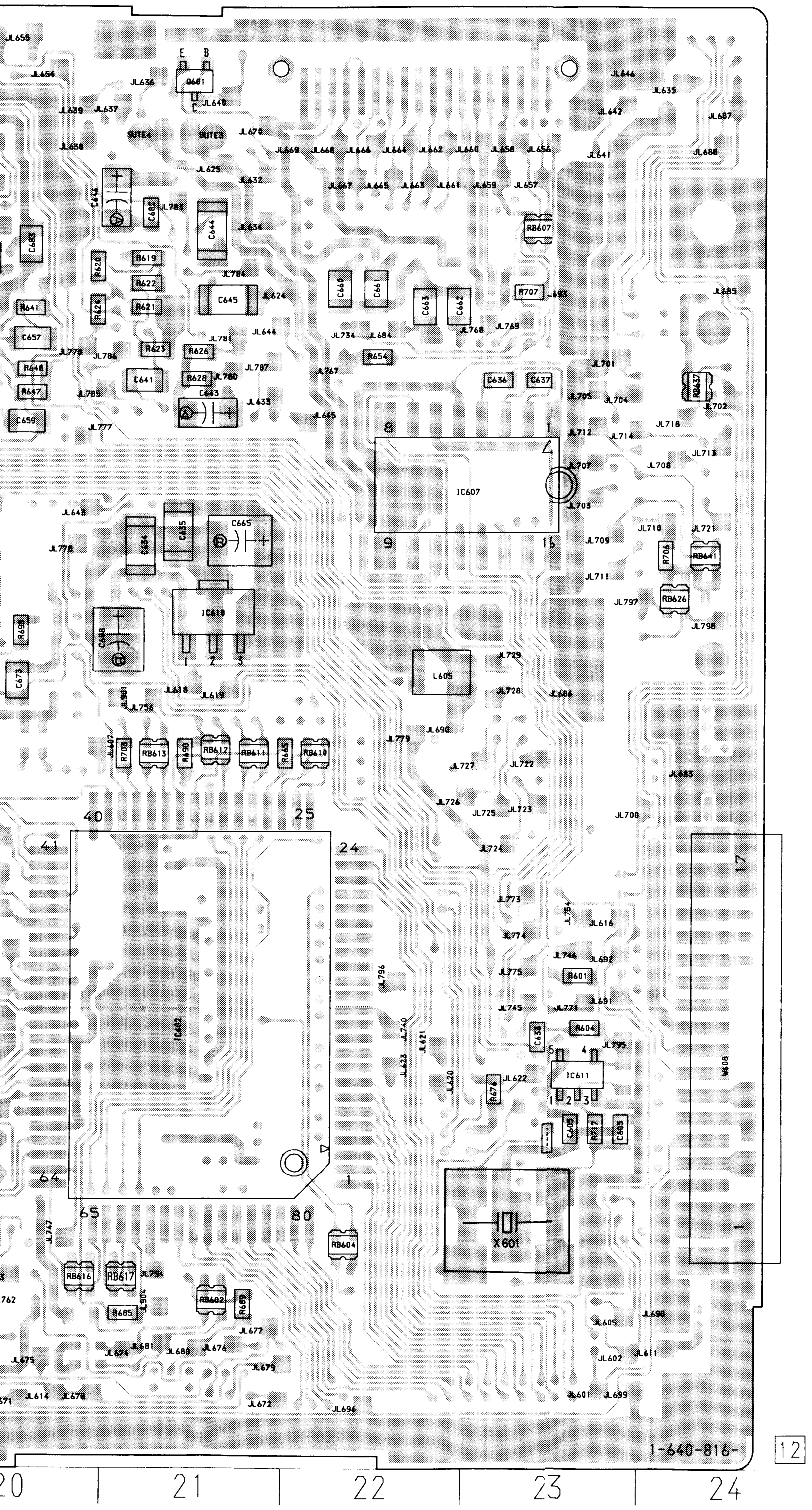
VS-87 BOARD (CONDUCTOR SIDE)



FP-423 FLEXI
(COMPO

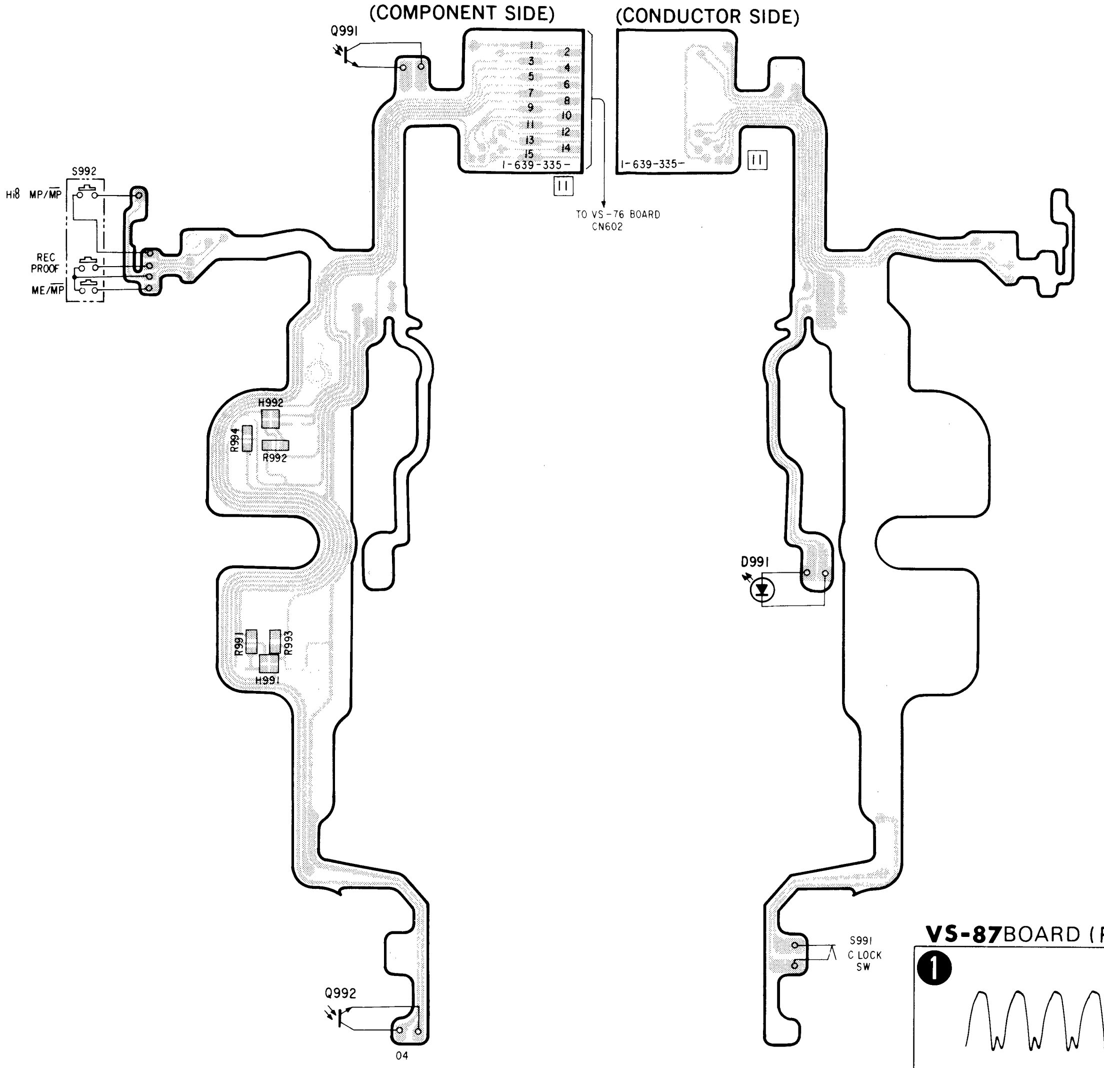


Q011	8-729-423-52	2SC3931
Q012	8-729-905-18	DTC144EU
Q013	8-729-824-02	2SA1838
Q014	8-729-824-02	2SA1838
Q015	8-729-423-52	2SC3931
Q016	8-729-905-18	DTC144EU
Q017	8-729-140-63	2SA1611-M5M6
Q018	8-729-905-18	DTC144EU
Q019	8-729-140-63	2SA1611-M5M6
Q020	8-729-140-63	2SA1611-M5M6
Q021	8-729-216-22	2SA1162
Q151	8-729-423-52	2SC3931
Q152	8-729-905-35	2SC4081-R
Q153	8-729-905-35	2SC4081-R
Q154	8-729-423-52	2SC3931
Q155	8-729-140-63	2SA1611-M5M6
Q157	8-729-905-18	DTC144EU
Q158	8-729-905-35	2SC4081-R
Q159	8-729-905-18	DTC144EU
Q160	8-729-904-20	FMA2
Q161	8-729-904-07	FMG2
Q162	8-729-904-20	FMA2
Q163	8-729-904-07	FMG2
Q165	8-729-823-16	2SC4555-5. 6. 7
Q166	8-729-905-18	DTC144EU
Q167	8-729-905-35	2SC4081-R
Q168	8-729-423-52	2SC3931
Q169	8-729-905-12	DTA144EU
Q170	8-729-905-35	2SC4081-R
Q171	8-729-905-18	DTC144EU
Q172	8-729-905-18	DTC144EU
Q173	8-729-905-18	DTC144EU
Q174	8-729-905-35	2SC4081-R
Q175	8-729-905-35	2SC4081-R
Q176	8-729-602-21	2SC4154
Q176	8-729-905-35	2SC4081-R
Q177	8-729-903-10	FMW1
Q178	8-729-140-63	2SA1611-M5M6
Q179	8-729-905-18	DTC144EU
Q180	8-729-140-63	2SA1611-M5M6
Q181	8-729-140-63	2SA1611-M5M6
Q182	8-729-905-18	DTC144EU
Q183	8-729-905-35	2SC4081-R
Q186	8-729-905-35	2SC4081-R
Q187	8-729-905-18	DTC144EU
Q189	8-729-903-10	FMW1
Q192	8-729-905-18	DTC144EU
Q193	8-729-904-20	FMA2
Q194	8-729-905-12	DTA144EU
Q195	8-729-905-35	2SC4081-R
Q196	8-729-905-18	DTC144EU
Q197	8-729-905-35	2SC4081-R
Q198	8-729-140-63	2SA1611-M5M6
Q199	8-729-905-18	DTC144EU
Q200	8-729-905-18	DTC144EU
Q201	8-729-905-35	2SC4081-R
Q202	8-729-905-35	2SC4081-R
Q301	8-729-905-96	DTA114TU
Q302	8-729-905-18	DTC144EU
Q303	8-729-904-07	FMG2
Q304	8-729-423-52	2SC3931
Q305	8-729-421-23	XN1216
Q306	8-729-423-52	2SC3931
Q307	8-729-402-78	XN6401
Q308	8-729-824-05	3SK248
Q309	8-729-824-05	3SK248
Q310	8-729-905-35	2SC4081-R
Q311	8-729-921-58	DTA144TU
Q312	8-729-905-18	DTC144EU
Q313	8-729-402-78	XN6401
Q314	8-729-106-60	2SB1115A
Q315	8-729-905-23	2SA1576-R
Q318	8-729-905-35	2SC4081-R
Q601	8-729-907-00	DTC114EU



FP-423 FLEXIBLE BOARD
(COMPONENT SIDE)

FP-423 FLEXIBLE BOARD
(CONDUCTOR SIDE)



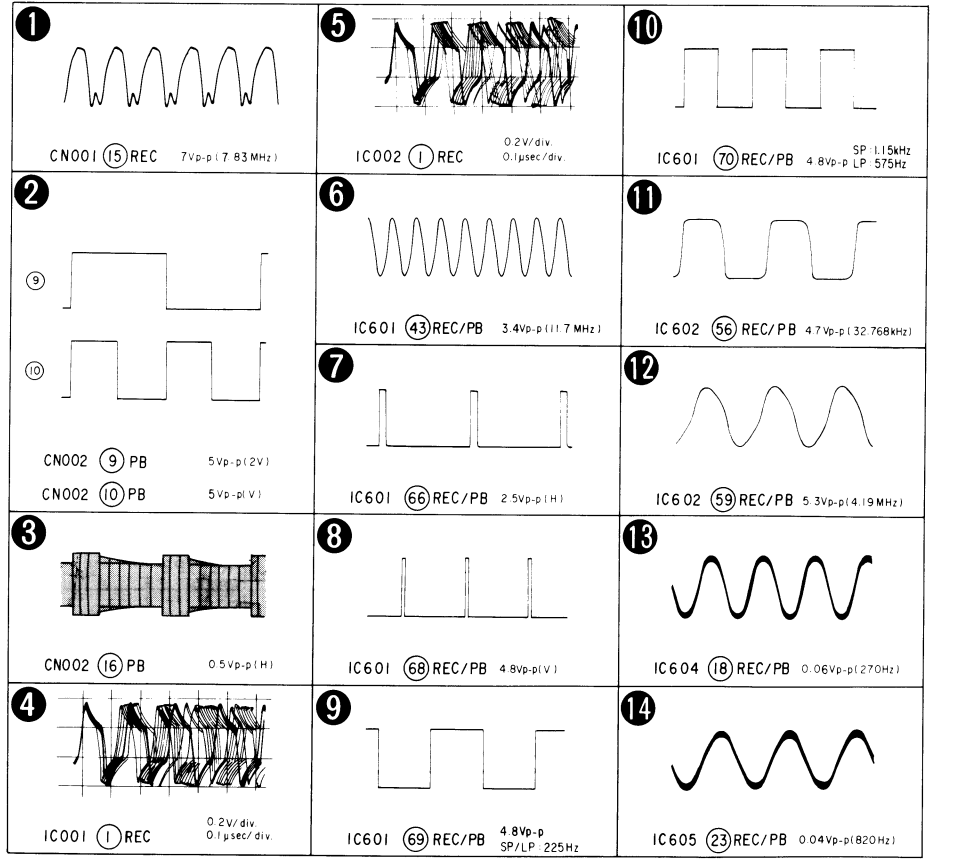
< DIODE >

D991	8-719-951-03	GL-453

< TRANSISTOR >

Q991	8-729-907-25	PT4850F
Q992	8-729-907-25	PT4850F

VS-87BOARD (RP,SS BLOCK)



HEAD AMP, SERVO, SYSTEM CONTROL

• Signal path

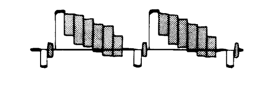
	VIDEO Signal			AUDIO Signal
	CHROMA	Y	Y/CHROMA	
REC	➡	➡➡	➡➡➡	➡
PB	⇨	⇨⇨	⇨⇨⇨	⇨

• Signal path

	REC	REC/PB	PB
Drum speed servo		▻	
Drum phase servo		▻▻	
Drum servo(speed and phase)		▻▻▻	
Capstan speed servo		▷	
Capstan phase servo	▶»	▷»	▷»
Capstan servo(speed and phase)		▷»»	
Ref.signal	▶	▷	▷

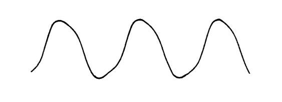
VS-87 BOARD
(RF, I/O BLOCK)

❶



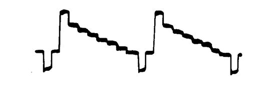
CN303 ④ REC/PB 1Vp-p(H)

❷



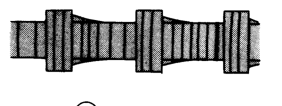
CN304 ③ REC/PB 0.38Vp-p(4.43MHz)

❸



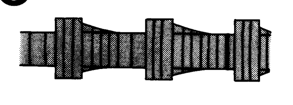
CN304 ⑦ PB 0.5Vp-p(H)

❹



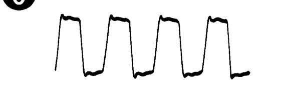
CN305 ⑬ PB 0.15Vp-p(H)

❺



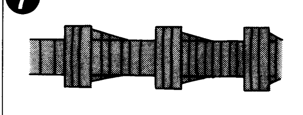
CN305 ⑯ PB 1.2Vp-p(H)

❻



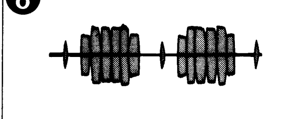
CN305 ⑰ REC 0.5Vp-p(6MHz)

❼



CN305 ⑰ PB 0.5Vp-p(H)

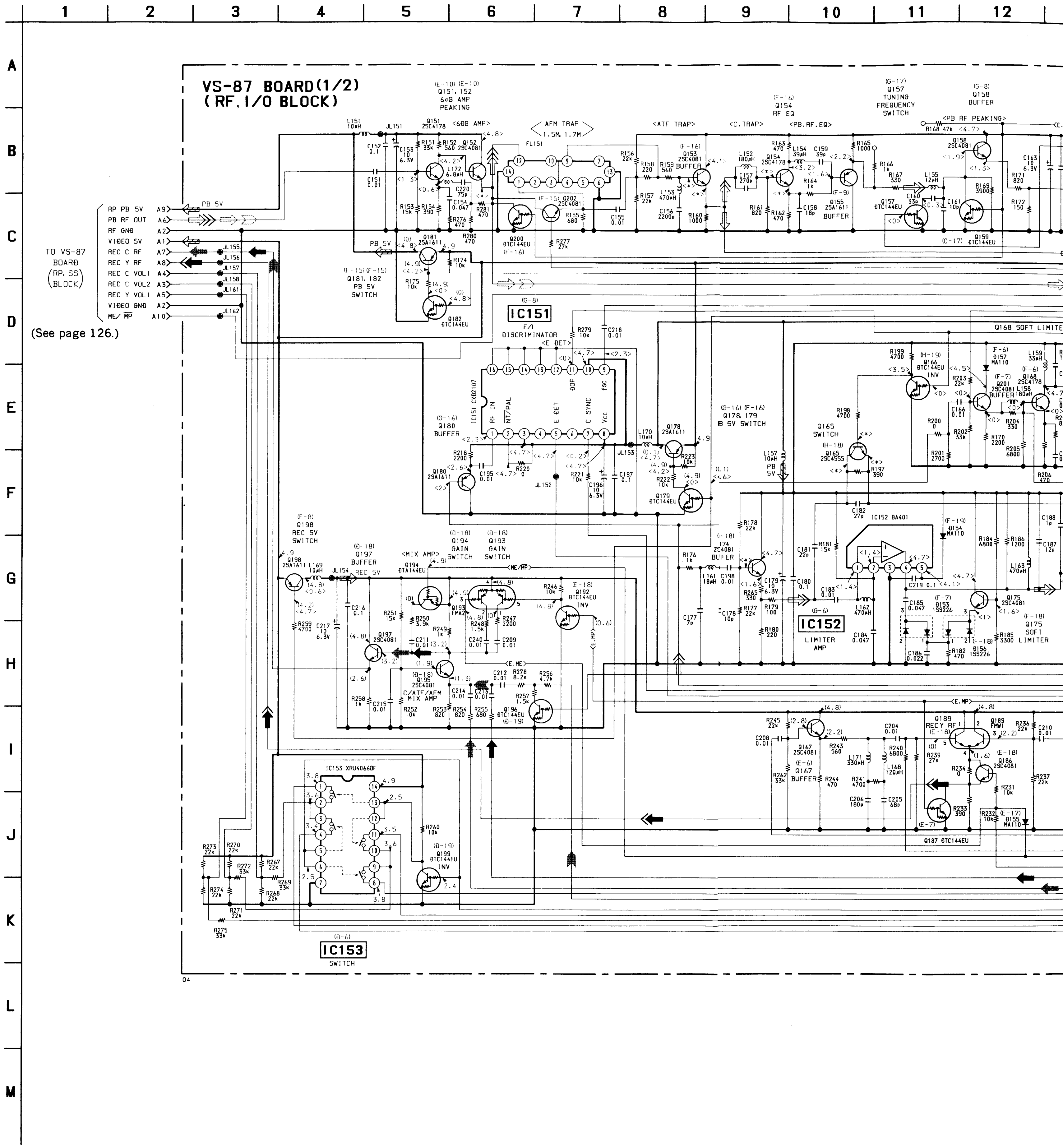
❽



CN305 ⑱ REC 0.15Vp-p(H)

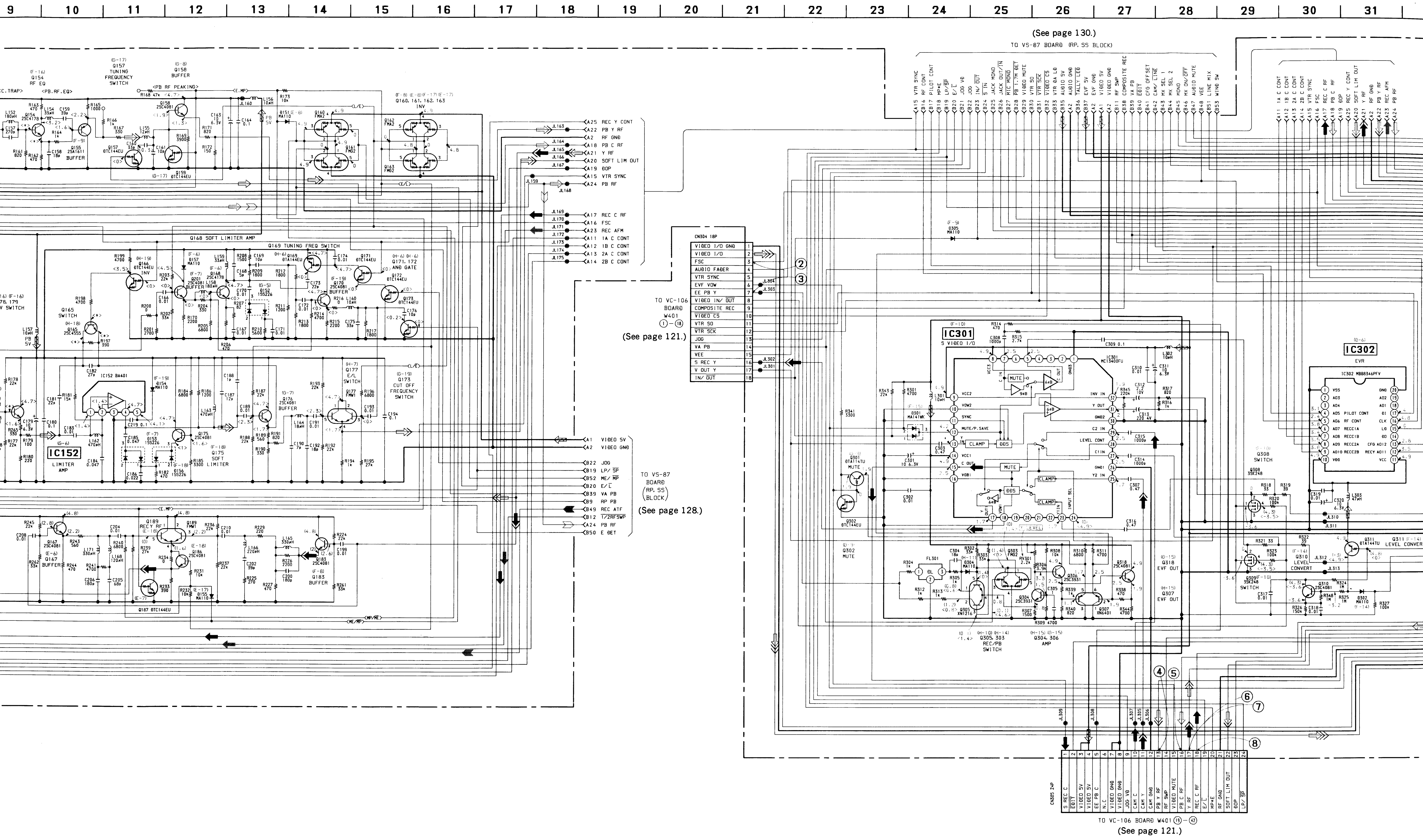
VS-87 (RF, IN/OUT) SCHEMATIC DIAGRAM

—Ref. No. VS-87 BOARD : 5000 series—



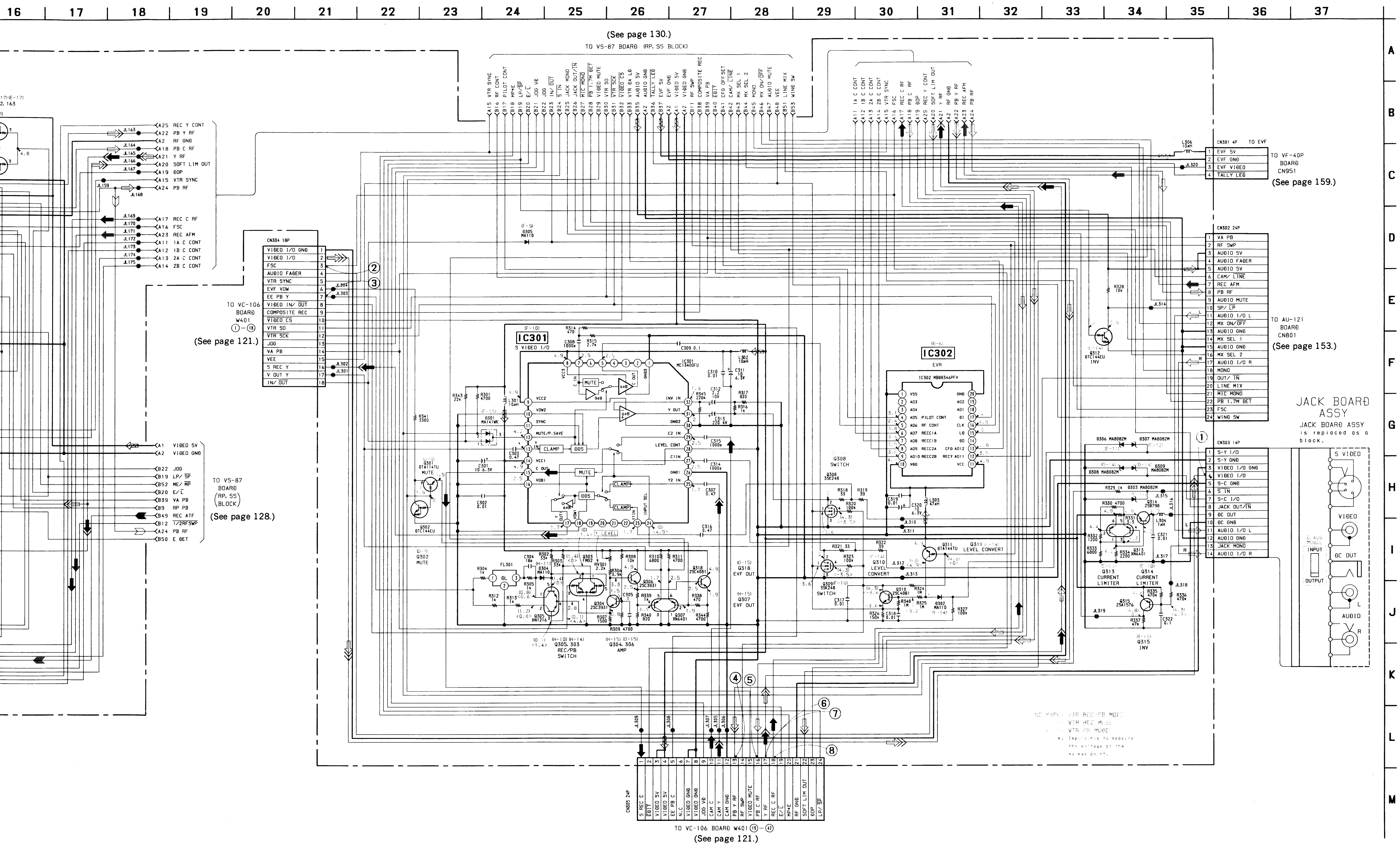
1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
I
J
K
L
M
VS-87 BOARD(1/2)
(RF, I/O BLOCK)
TO VS-87 BOARD (RP, SS BLOCK)
RP PB 5V A9
PB RF OUT A6
RF GND A2
VIDEO 5V A1
REC C RF A7
REC Y RF A8
REC C VOL1 A4
REC C VOL2 A3
REC Y VOL1 A5
VIDEO GND A2
ME/MP A10
PB 5V
Q151, 152 6dB AMP PEAKING
<6dB AMP>
AFM TRAP 1.5M, 1.7M
FL151
<ATF TRAP>
<C.TRAP>
<PB.RF.EQ>
Q154 RF EQ
Q157 TUNING FREQUENCY SWITCH
Q158 BUFFER
<PB RF PEAKING>
Q153 BUFFER
Q155 2SA1611 BUFFER
Q159 DTC144EU
Q181, 182 PB 5V SWITCH
Q200 DTC144EU
IC151
E/L DISCRIMINATOR
<E DET>
IC151 CX20107
RF IN
NT/PAL
E DET
GOP
C SYNC
fsc
Vcc
Q180 BUFFER
Q178, 179 B 5V SWITCH
Q165 SWITCH
Q168 SOFT LIMITER
Q166 INV
Q201 BUFFER
Q198 REC 5V SWITCH
Q197 BUFFER
<MIX AMP>
Q194 GAIN SWITCH
Q193 GAIN SWITCH
Q192 INV
Q195 C/ATF/AFM MIX AMP
Q196 INV
Q174 BUFFER
IC152 BA401
IC152
LIMITER AMP
Q154 MA110
Q175 SOFT LIMITER
Q153 1SS226
Q156 1SS226
Q189 REC Y RF 1
Q167 BUFFER
Q186
Q187 DTC144EU
Q155 MA110
IC153 XRU4066BF
IC153
SWITCH
Q199 INV

(See page 126.)



9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
(See page 130.)
TO VS-87 BOARD (RP, SS BLOCK)
Q154 RF EQ
Q157 TUNING FREQUENCY SWITCH
Q158 BUFFER
Q155 BUFFER
Q160, 161, 162, 163 INV
Q168 SOFT LIMITER AMP
Q169 TUNING FREQ SWITCH
Q165 SWITCH
IC152 BA401
IC152 LIMITER AMP
Q175 SOFT LIMITER
Q176 BUFFER
Q177 E/L SWITCH
Q173 CUT OFF FREQUENCY SWITCH
Q171, 172 AND GATE
Q167 BUFFER
Q189 RECY RF
Q183 BUFFER
Q187 DTC144EU
CN304 18P
TO VC-106 BOARD W401 ①-⑱
(See page 121.)
TO VS-87 BOARD (RP, SS BLOCK)
(See page 128.)
IC301 S VIDEO I/O
IC301 MC13400FU
IC302 EVR
IC302 MB88346PFV
Q301 MUTE
Q302 MUTE
Q305, 303 REC/PB SWITCH
Q304, 306 AMP
Q318 EVF OUT
Q307 EVF OUT
Q308 SWITCH
Q309 SWITCH
Q310 LEVEL CONVERT
Q311 LEVEL CONVER
CN305 24P
TO VC-106 BOARD W401 ⑲-㊷
(See page 121.)

RF, IN/OUT RF, IN/OUT

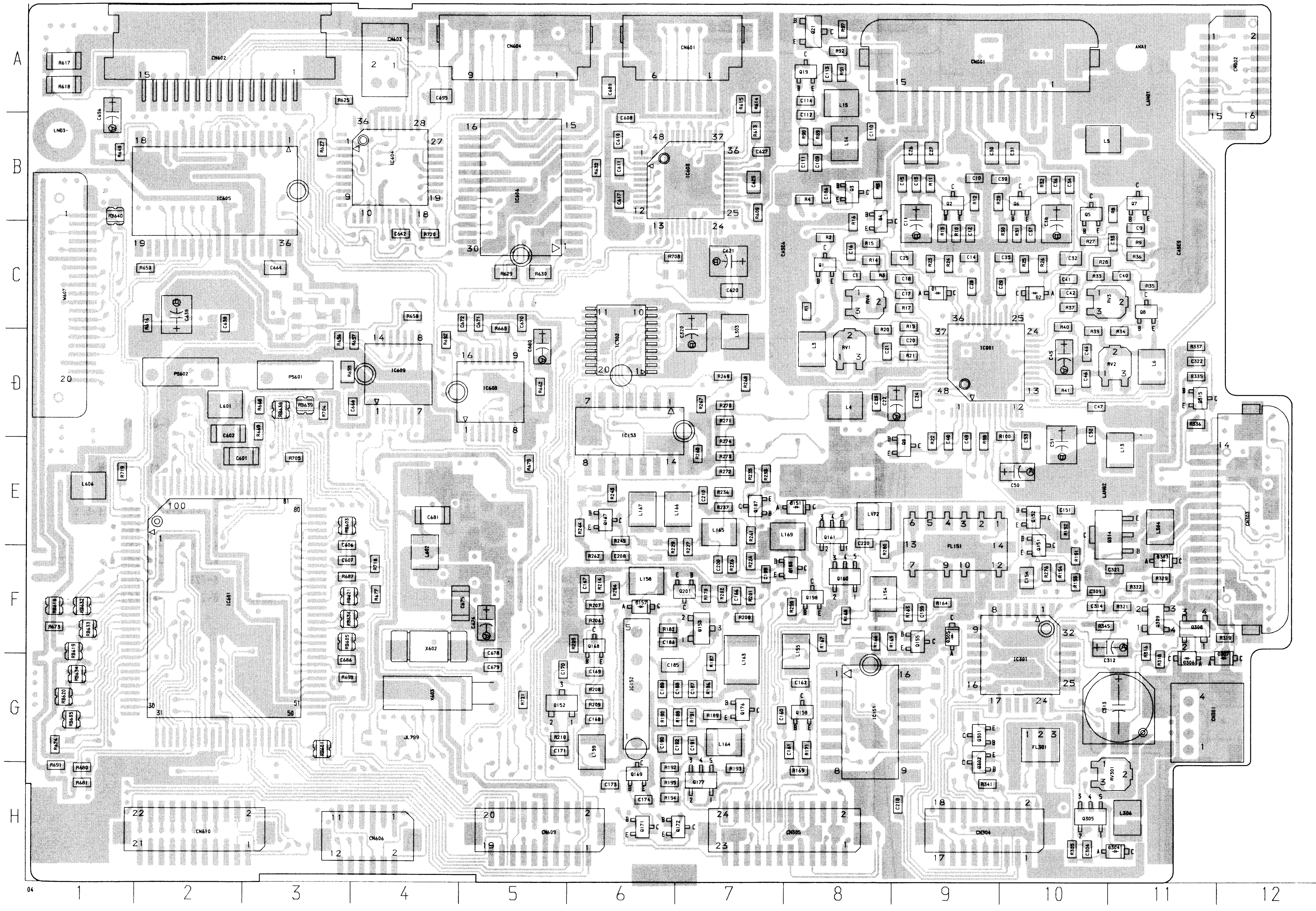

16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
A
B
C
D
E
F
G
H
I
J
K
L
M
(See page 130.)
TO VS-87 BOARD (RP, SS BLOCK)
A15 VTR SYNC
B16 RF CONT
B17 PILOT CONT
B18 MP•E
B19 LP/SP
B20 E/L
B21 JOG V0
B22 JOG
B23 IN/OUT
B24 S IN
B25 JACK MONO
B26 JACK OUT/IN
B27 MIC MONO
B28 PB 1.7M DET
B29 VIDEO MUTE
B30 VTR SO
B31 VTR SCK
B32 VIDEO CS
B33 VTR 8A L0
A1 AUDIO 5V
A2 AUDIO GND
B36 TALLY LED
B37 EVF 5V
A2 EVF GND
A1 VIDEO 5V
A2 VIDEO GND
B11 RF SWP
B38 COMPOSITE REC
B39 VA PB
B40 EDIT
B41 CFG OFFSET
B42 CAM/LINE
B43 MX SEL 1
B44 MX SEL 2
B45 MONO
B46 MX ON/OFF
B47 AUDIO MUTE
B48 VEE
B51 LINE MIX
B53 WIND SW
A11 1A C CONT
A12 1B C CONT
A13 2A C CONT
A14 2B C CONT
A15 VTR SYNC
A16 FSC
A17 REC C RF
A18 PB C RF
A19 0OP
A25 REC Y CONT
A20 SOFT LIM OUT
A21 Y RF
A2 RF GND
A22 PB Y RF
A23 REC AFM
A24 PB RF
A25 REC Y CONT
A22 PB Y RF
A2 RF GND
A18 PB C RF
A21 Y RF
A20 SOFT LIM OUT
A19 0OP
A15 VTR SYNC
A24 PB RF
A17 REC C RF
A16 FSC
A23 REC AFM
A11 1A C CONT
A12 1B C CONT
A13 2A C CONT
A14 2B C CONT
CN304 18P
1 VIDEO I/O GND
2 VIDEO I/O
3 FSC
4 AUDIO FADER
5 VTR SYNC
6 EVF VDW
7 EE PB Y
8 VIDEO IN/OUT
9 COMPOSITE REC
10 VIDEO CS
11 VTR SO
12 VTR SCK
13 JOG
14 VA PB
15 VEE
16 S REC Y
17 V OUT Y
18 IN/OUT
TO VC-106 BOARD W401 ①-⑱
(See page 121.)
A1 VIDEO 5V
A2 VIDEO GND
B22 JOG
B19 LP/SP
B52 ME/MP
B20 E/L
B39 VA PB
B9 RP PB
B49 REC ATF
B12 1/2RFSWP
A24 PB RF
B50 E DET
TO VS-87 BOARD (RP, SS) (BLOCK)
(See page 128.)
IC301
S VIDEO I/O
IC301 MC13400FU
MUTE
CLAMP
DDS
IC302
EVR
IC302 MB88346PFV
CN301 4P TO EVF
1 EVF 5V
2 EVF GND
3 EVF VIDEO
4 TALLY LED
TO VF-40P BOARD CN951
(See page 159.)
CN302 24P
1 VA PB
2 RF SWP
3 AUDIO 5V
4 AUDIO FADER
5 AUDIO 5V
6 CAM/LINE
7 REC AFM
8 PB RF
9 AUDIO MUTE
10 SP/LP
11 AUDIO I/O L
12 MX ON/OFF
13 AUDIO GND
14 MX SEL 1
15 AUDIO GND
16 MX SEL 2
17 AUDIO I/O R
18 MONO
19 OUT/IN
20 LINE MIX
21 MIC MONO
22 PB 1.7M DET
23 FSC
24 WIND SW
TO AU-121 BOARD CN801
(See page 153.)
JACK BOARD ASSY
JACK BOARD ASSY is replaced as a block.
CN303 14P
1 S-Y I/O
2 S-Y GND
3 VIDEO I/O GND
4 VIDEO I/O
5 S-C GND
6 S IN
7 S-C I/O
8 JACK OUT/IN
9 DC OUT
10 DC GND
11 AUDIO I/O L
12 AUDIO GND
13 JACK MONO
14 AUDIO I/O R
S VIDEO
VIDEO
DC OUT
INPUT
OUTPUT
L
AUDIO
R
Q301 DTA114TU MUTE
Q302 DTC144EU
Q302 MUTE
Q303, 304 REC/PB SWITCH
Q305 XN1216
Q304, 306 AMP
Q306 2SC3931
Q307 XN6401
Q318 2SC4081
Q318 EVF OUT
Q307 EVF OUT
Q308 SWITCH
Q308 3SK248
Q309 3SK248 SWITCH
Q310 LEVEL CONVERT
Q310 2SC4081
Q311 DTA144TU
Q311 LEVEL CONVERT
Q312 DTC144EU INV
Q313 CURRENT LIMITER
Q314 CURRENT LIMITER
Q314 2SB798
Q315 2SA1576
Q315 INV
D305 MA110
D301 MA141WK
D302 MA110
D306 MA8082M
D307 MA8082M
D308 MA8082M
D309 MA8082M
FL301
RV301
CN305 24P
1 S REC C
2 EDIT
3 VIDEO 5V
4 VIDEO 5V
5 EE PB C
6 N.C
7 VIDEO GND
8 VIDEO GND
9 JOG VD
10 CAM C
11 CAM Y
12 CAM GND
13 PB Y RF
14 RF SWP
15 VIDEO MUTE
16 PB C RF
17 Y RF
18 REC C RF
19 E/L
20 MP•E
21 RF GND
22 SOFT LIM OUT
23 0OP
24 LP/SP
TO VC-106 BOARD W401 ⑲-㊷
(See page 121.)

RF, IN/OUT RF, IN/OUT

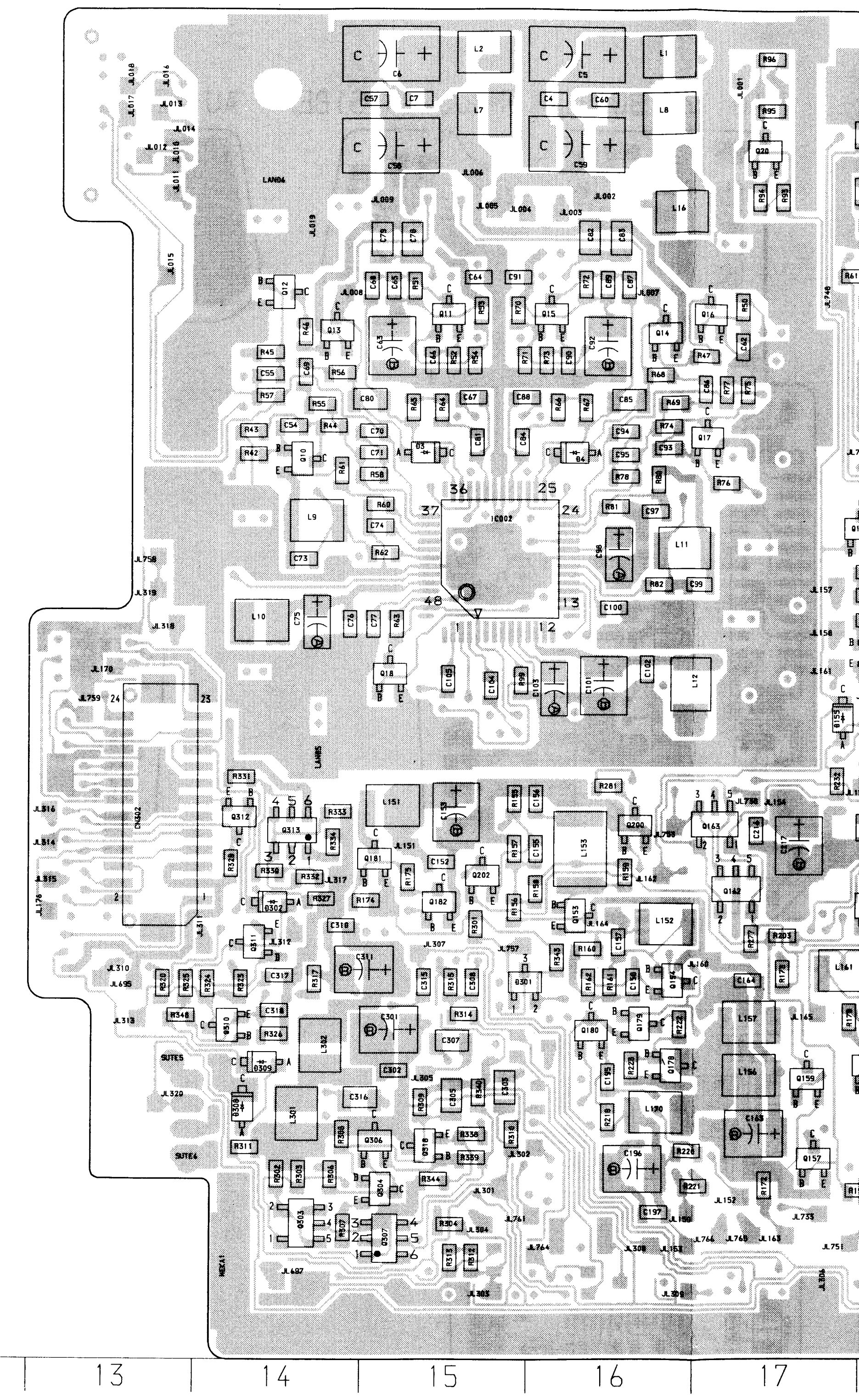
VS-87 (RF, IN/OUT) PRINTED WIRING BOARD

—Ref. No. VS-87 BOARD : 5000 series—

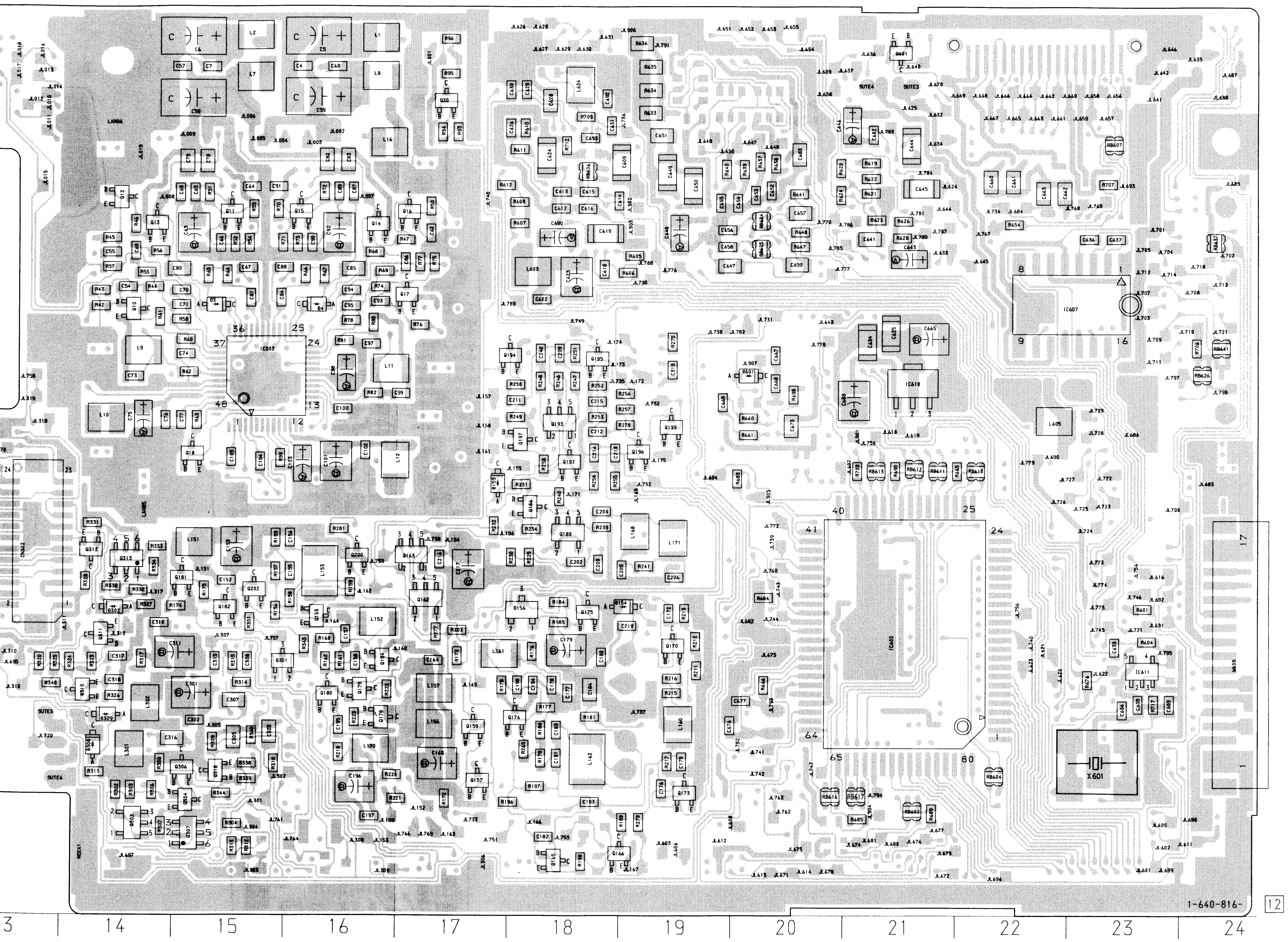
VS-87 BOARD (COMPONENT SIDE)


A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
8
9
10
11
12
CN602
CN603
CN604
CN601
CN001
CN002
IC605
IC604
IC606
IC603
IC609
IC608
IC602
IC153
IC001
IC601
IC152
IC151
IC301
FL151
FL301
CN303
CN301
CN610
CN606
CN609
CN305
CN304
X602
PS602
PS601

VS-87 BOARD (CONDUCTOR SIDE)


13
14
15
16
17
IC002
CN402

-87 BOARD (CONDUCTOR SIDE)



< DIODE >

D001	8-719-404-46	MA110
D002	8-719-404-46	MA110
D003	8-719-404-46	MA110
D004	8-719-404-46	MA110
D151	8-719-404-46	MA110
D152	8-719-800-76	1SS226
D153	8-719-800-76	1SS226
D154	8-719-404-46	MA110
D155	8-719-404-46	MA110
D156	8-719-800-76	1SS226
D157	8-719-404-46	MA110
D301	8-719-404-35	MA141WK
D302	8-719-404-46	MA110
D303	8-719-420-14	MA8082-M
D304	8-719-404-46	MA110
D305	8-719-404-46	MA110
D306	8-719-420-14	MA8082-M
D307	8-719-420-14	MA8082-M
D308	8-719-420-14	MA8082-M
D309	8-719-420-14	MA8082-M
D601	8-719-421-27	MA728

< IC >

IC001	8-752-033-00	CXA1234AR
IC002	8-752-033-00	CXA1234AR
IC151	8-759-998-32	CXD-2107M
IC152	8-759-925-60	BA401
IC153	8-759-509-05	XRU4066BF
IC301	8-759-038-83	MC13400FUEB
IC302	8-759-521-09	MB88346APFV
IC601	8-752-833-59	CXP80624-245Q
IC602	8-759-044-07	uPD75304GF-210-3B9
IC603	8-759-512-42	CXA1481R
IC604	8-759-823-90	LB8110M
IC605	8-759-823-65	MCD002AM
IC606	8-759-057-60	MCD004BM
IC607	8-759-038-98	MPC1726MR2
IC608	8-759-511-22	CXA1448N
IC609	8-759-999-02	TL1596CDB
IC610	8-759-512-69	S-81350HG-KD
IC611	8-759-243-19	TC7SU04F

< TRANSISTOR >

Q001	8-729-140-63	2SA1611-M5M6
Q002	8-729-423-52	2SC3931
Q003	8-729-905-18	DTC144EU
Q004	8-729-824-02	2SA1838
Q005	8-729-824-02	2SA1838
Q006	8-729-423-52	2SC3931
Q007	8-729-905-18	DTC144EU
Q008	8-729-140-63	2SA1611-M5M6
Q009	8-729-905-18	DTC144EU
Q010	8-729-140-63	2SA1611-M5M6
Q011	8-729-423-52	2SC3931
Q012	8-729-905-18	DTC144EU
Q013	8-729-824-02	2SA1838
Q014	8-729-824-02	2SA1838
Q015	8-729-423-52	2SC3931
Q016	8-729-905-18	DTC144EU
Q017	8-729-140-63	2SA1611-M5M6
Q018	8-729-905-18	DTC144EU
Q019	8-729-140-63	2SA1611-M5M6
Q020	8-729-140-63	2SA1611-M5M6
Q021	8-729-216-22	2SA1162
Q151	8-729-423-52	2SC3931
Q152	8-729-905-35	2SC4081-R
Q153	8-729-905-35	2SC4081-R
Q154	8-729-423-52	2SC3931
Q155	8-729-140-63	2SA1611-M5M6
Q157	8-729-905-18	DTC144EU
Q158	8-729-905-35	2SC4081-R
Q159	8-729-905-18	DTC144EU
Q160	8-729-904-20	FMA2
Q161	8-729-904-07	FMG2
Q162	8-729-904-20	FMA2
Q163	8-729-904-07	FMG2
Q165	8-729-823-16	2SC4555-5. 6. 7
Q166	8-729-905-18	DTC144EU
Q167	8-729-905-35	2SC4081-R
Q168	8-729-423-52	2SC3931
Q169	8-729-905-12	DTA144EU
Q170	8-729-905-35	2SC4081-R
Q171	8-729-905-18	DTC144EU
Q172	8-729-905-18	DTC144EU
Q173	8-729-905-18	DTC144EU
Q174	8-729-905-35	2SC4081-R
Q175	8-729-905-35	2SC4081-R
Q176	8-729-602-21	2SC4154
Q176	8-729-905-35	2SC4081-R
Q177	8-729-903-10	FMW1
Q178	8-729-140-63	2SA1611-M5M6
Q179	8-729-905-18	DTC144EU
Q180	8-729-140-63	2SA1611-M5M6
Q181	8-729-140-63	2SA1611-M5M6
Q182	8-729-905-18	DTC144EU
Q183	8-729-905-35	2SC4081-R
Q186	8-729-905-35	2SC4081-R
Q187	8-729-905-18	DTC144EU
Q189	8-729-903-10	FMW1
Q192	8-729-905-18	DTC144EU
Q193	8-729-904-20	FMA2
Q194	8-729-905-12	DTA144EU
Q195	8-729-905-35	2SC4081-R
Q196	8-729-905-18	DTC144EU
Q197	8-729-905-35	2SC4081-R
Q198	8-729-140-63	2SA1611-M5M6
Q199	8-729-905-18	DTC144EU
Q200	8-729-905-18	DTC144EU
Q201	8-729-905-35	2SC4081-R
Q202	8-729-905-35	2SC4081-R
Q301	8-729-905-96	DTA114TU
Q302	8-729-905-18	DTC144EU
Q303	8-729-904-07	FMG2
Q304	8-729-423-52	2SC3931
Q305	8-729-421-23	XN1216
Q306	8-729-423-52	2SC3931
Q307	8-729-402-78	XN6401
Q308	8-729-824-05	3SK248
Q309	8-729-824-05	3SK248
Q310	8-729-905-35	2SC4081-R
Q311	8-729-921-58	DTA144TU
Q312	8-729-905-18	DTC144EU
Q313	8-729-402-78	XN6401
Q314	8-729-106-60	2SB1115A
Q315	8-729-905-23	2SA1576-R
Q318	8-729-905-35	2SC4081-R
Q601	8-729-907-00	DTC114EU

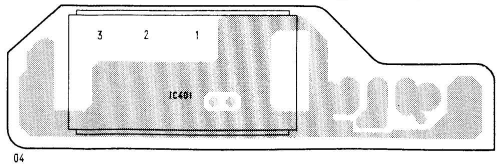
AU-121 (AFM STEREO) HL-4 (HP/LANC JACK) MA-116 (MIC) RM-56 (REMOTE CONTROL RECEIVER) PRINTED WIRING BOARDS

—Ref. No. AU-121, HL-4, MA-116 and RM-56 BOARDS : 6000 series—

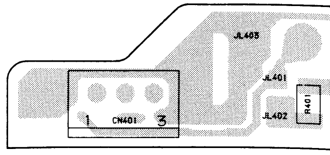
< IC >

IC401	8-741-100-64	SBX1621-51

RM-56 BOARD (COMPONENT SIDE)


3
2
1
IC401
04

RM-56 BOARD (CONDU


JL403
JL401
JL402
1
CN401
3

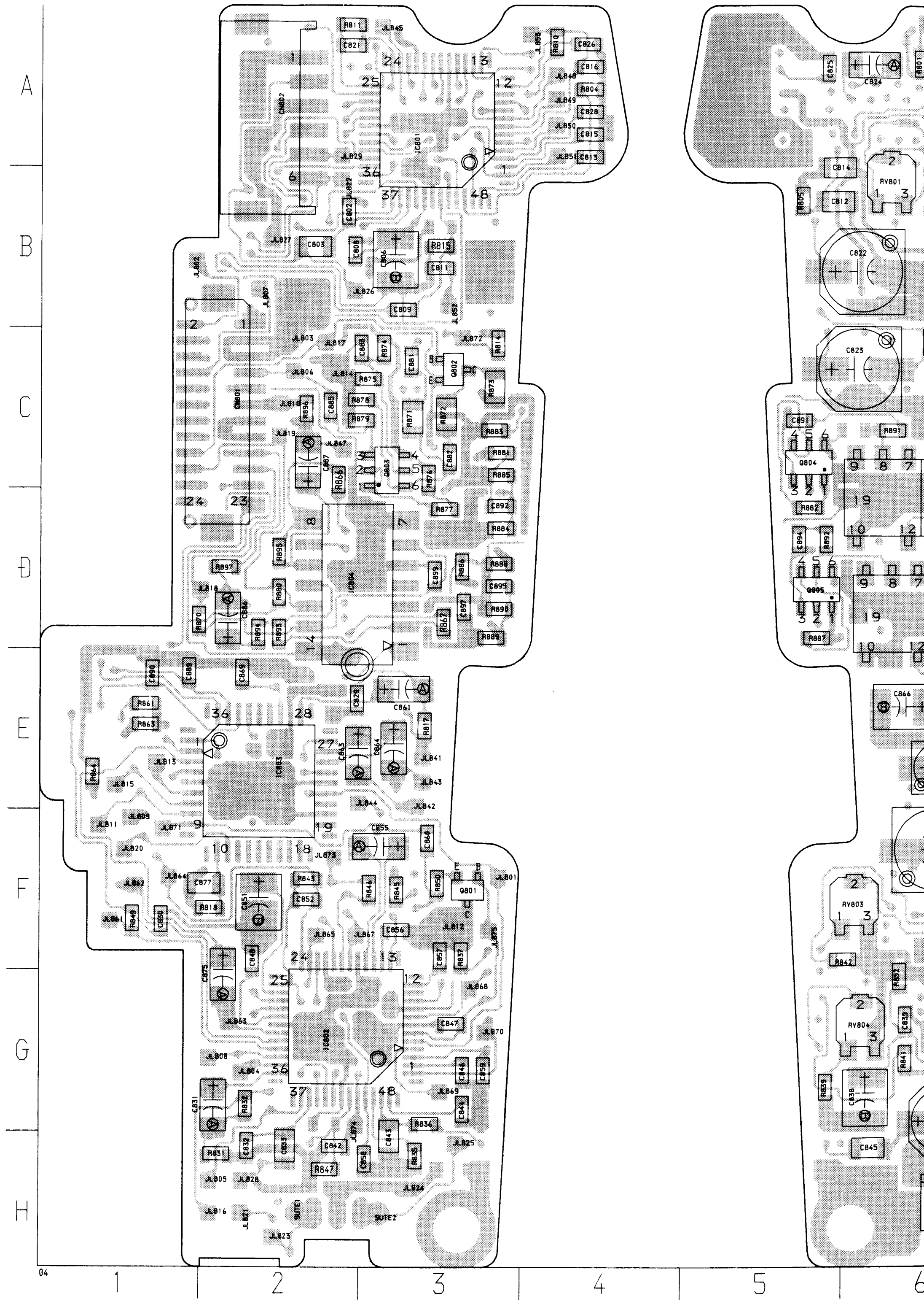
< IC >

IC801	8-759-823-19	CXA1488R
IC802	8-759-823-19	CXA1488R
IC803	8-759-823-21	CXA1536Q
IC804	8-759-008-67	MC14066BF

< TRANSISTOR >

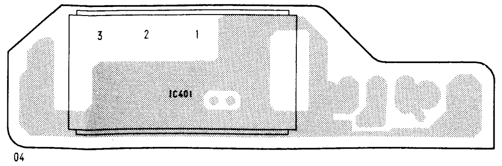
Q801	8-729-905-23	2SA1576-R
Q802	8-729-905-18	DTC144EU
Q803	8-729-402-81	XN4501
Q804	8-729-402-81	XN4501
Q805	8-729-402-81	XN4501

AU-121 BOARD (CONDUCTOR SIDE) AU-121 BOARD (C

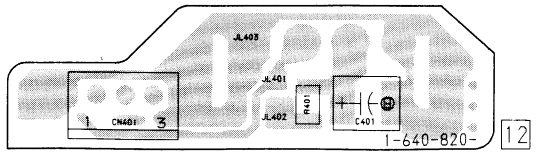

A
B
C
D
E
F
G
H
1
2
3
4
5
6
04
IC801
IC802
IC803
IC804
CN801
Q801
Q802
Q803
Q804
Q805
RV801
RV803
RV804

1-51

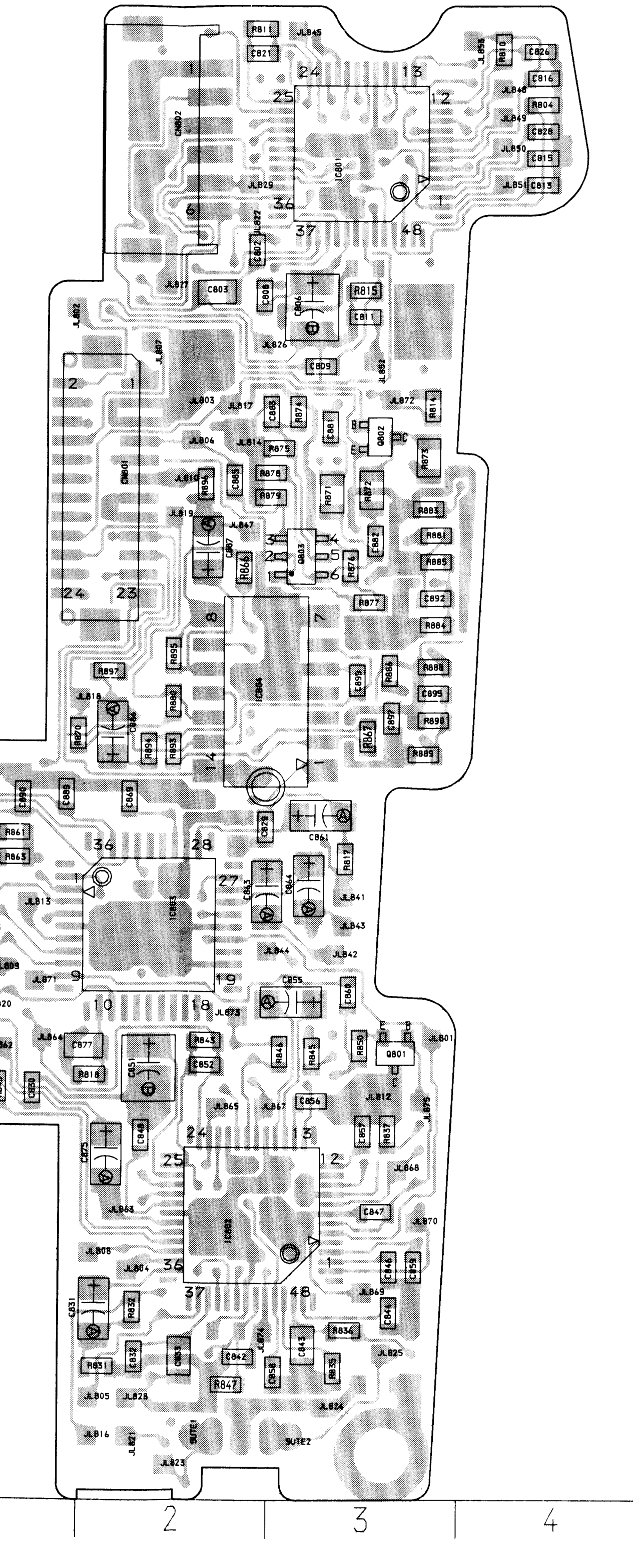
RM-56 BOARD (COMPONENT SIDE)



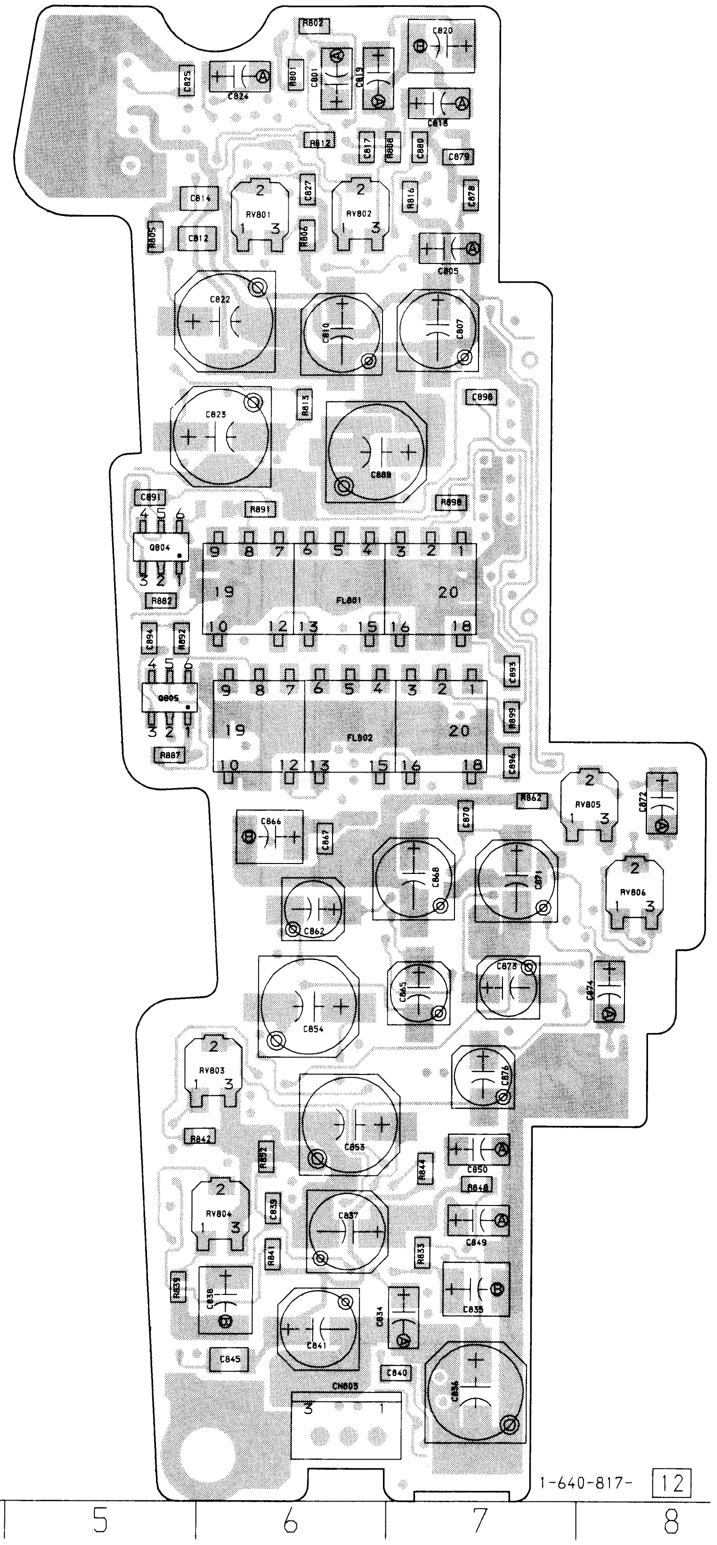
RM-56 BOARD (CONDUCTOR SIDE)


CN401
1-640-820- 12

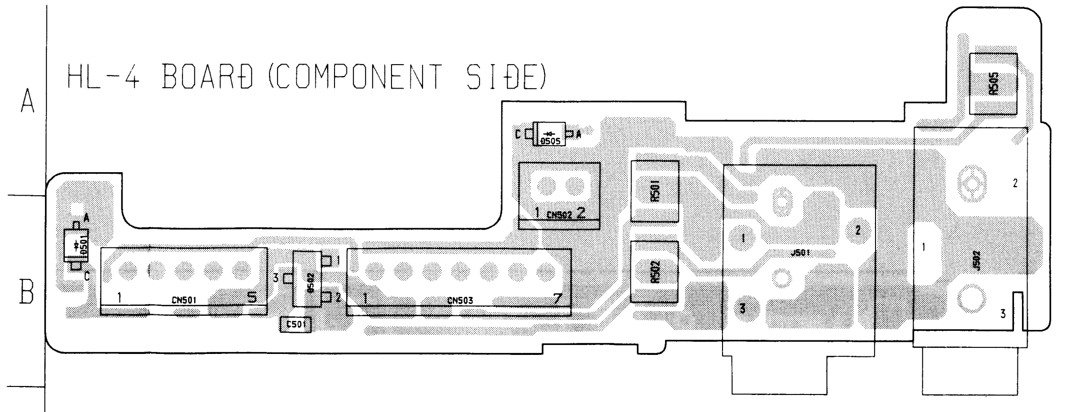
AU-121 BOARD (CONDUCTOR SIDE)


IC801
IC803
IC802
2
3
4

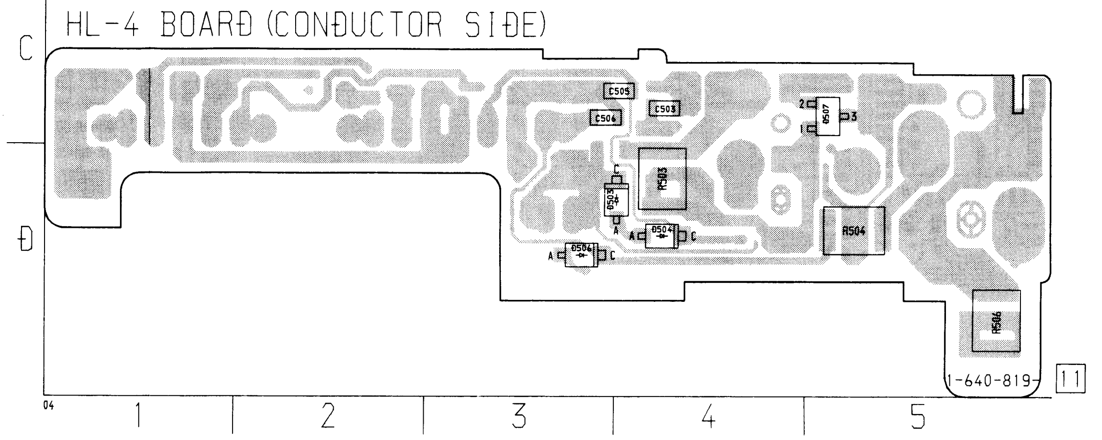
AU-121 BOARD (COMPONENT SIDE)


FL801
FL802
CN803
1-640-817- 12
5
6
7
8

HL-4 BOARD (COMPONENT SIDE)


A
B
CN501
CN502
CN503
J501
J502

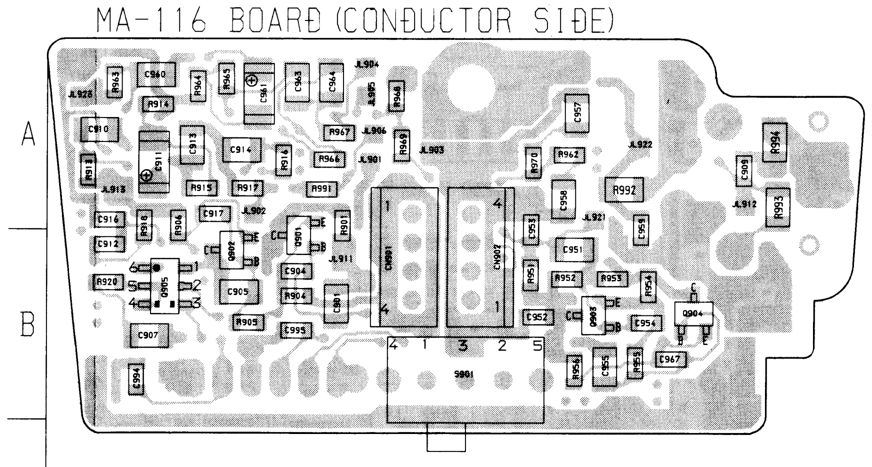
HL-4 BOARD (CONDUCTOR SIDE)


C
D
1-640-819- 11
04
1
2
3
4
5

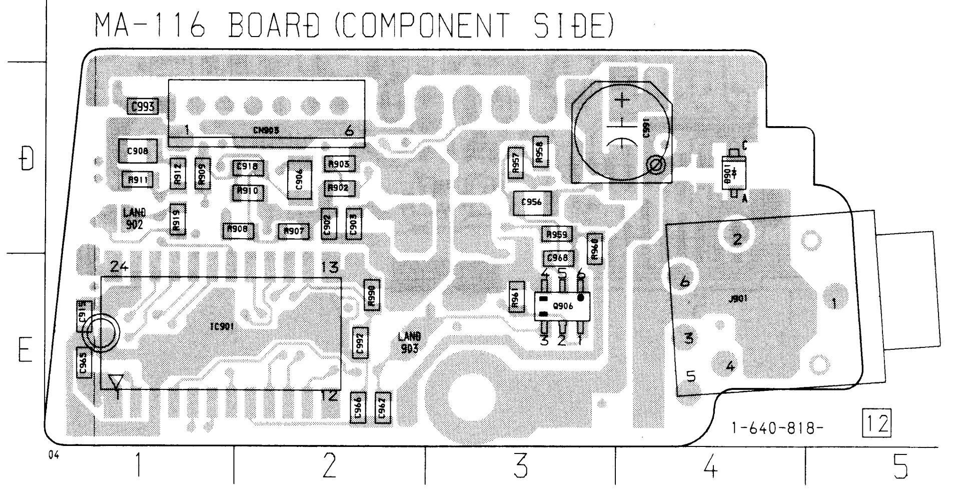
< DIODE >

D501	8-719-420-14	MA8082-M
D502	8-719-106-71	RD12M-B2
D503	8-719-420-14	MA8082-M
D504	8-719-420-14	MA8082-M
D505	8-719-420-14	MA8082-M
D506	8-719-420-14	MA8082-M
D507	8-719-941-86	DAN202U

MA-116 BOARD (CONDUCTOR SIDE)


A
B
C
CN901
CN902
S901

MA-116 BOARD (COMPONENT SIDE)


D
E
CN903
IC901
J901
1-640-818- 12
04
1
2
3
4
5

< DIODE >

D901	8-719-404-46	MA110

< IC >

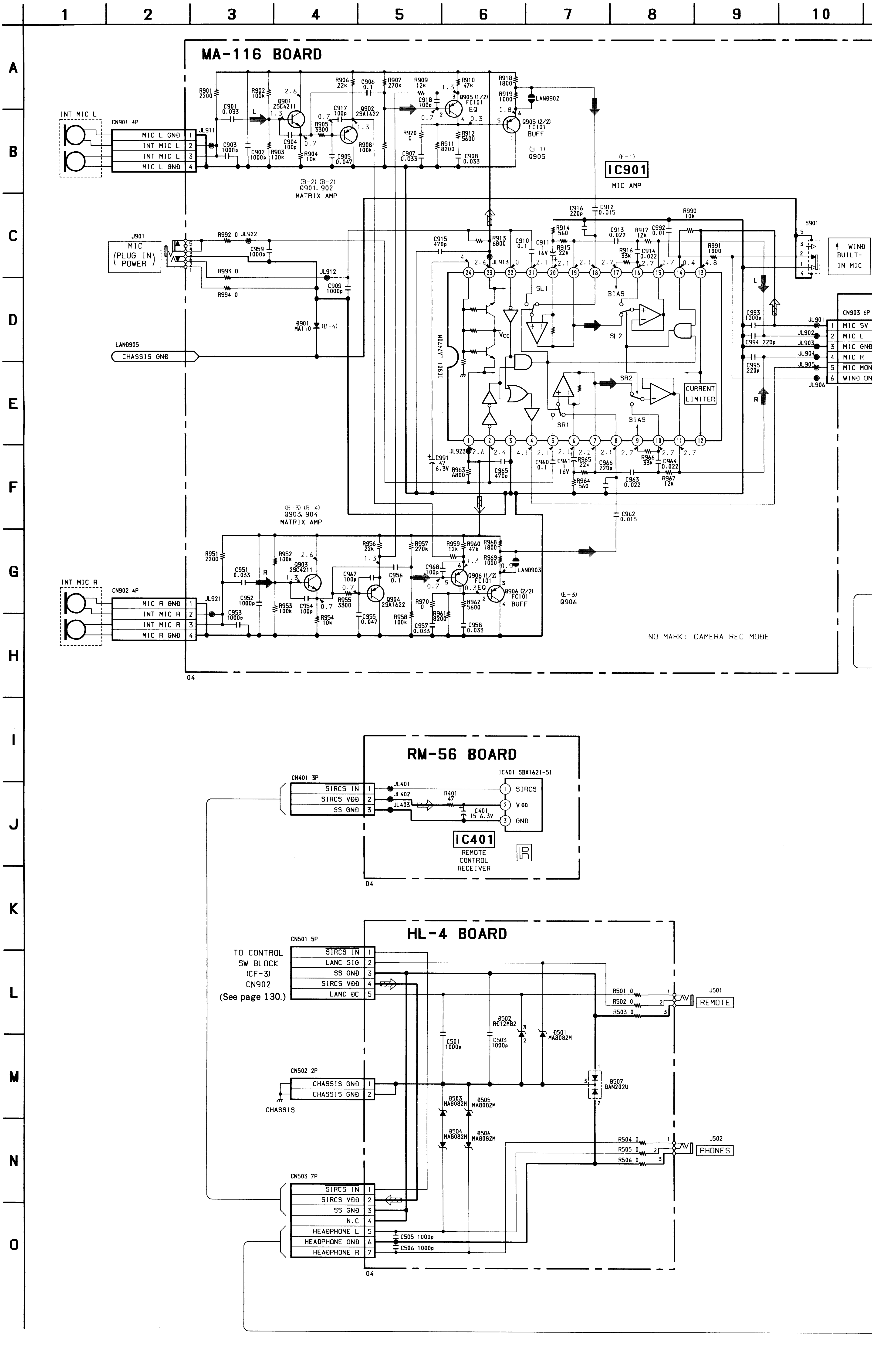
IC901	8-759-823-41	LA7470M

< TRANSISTOR >

Q901	8-729-822-97	2SC4211-5. 6. 7
Q902	8-729-823-00	2SA1622-5. 6. 7
Q903	8-729-822-97	2SC4211-5. 6. 7
Q904	8-729-823-00	2SA1622-5. 6. 7
Q905	8-729-822-48	FC101
Q906	8-729-822-48	FC101

AU-121 (AFM STEREO) HL-4 (HP/LANC JACK) MA-116 (MIC) RM-56 (REMOTE CONTROL RECEIVER) SCHEMATIC DIAGRAM

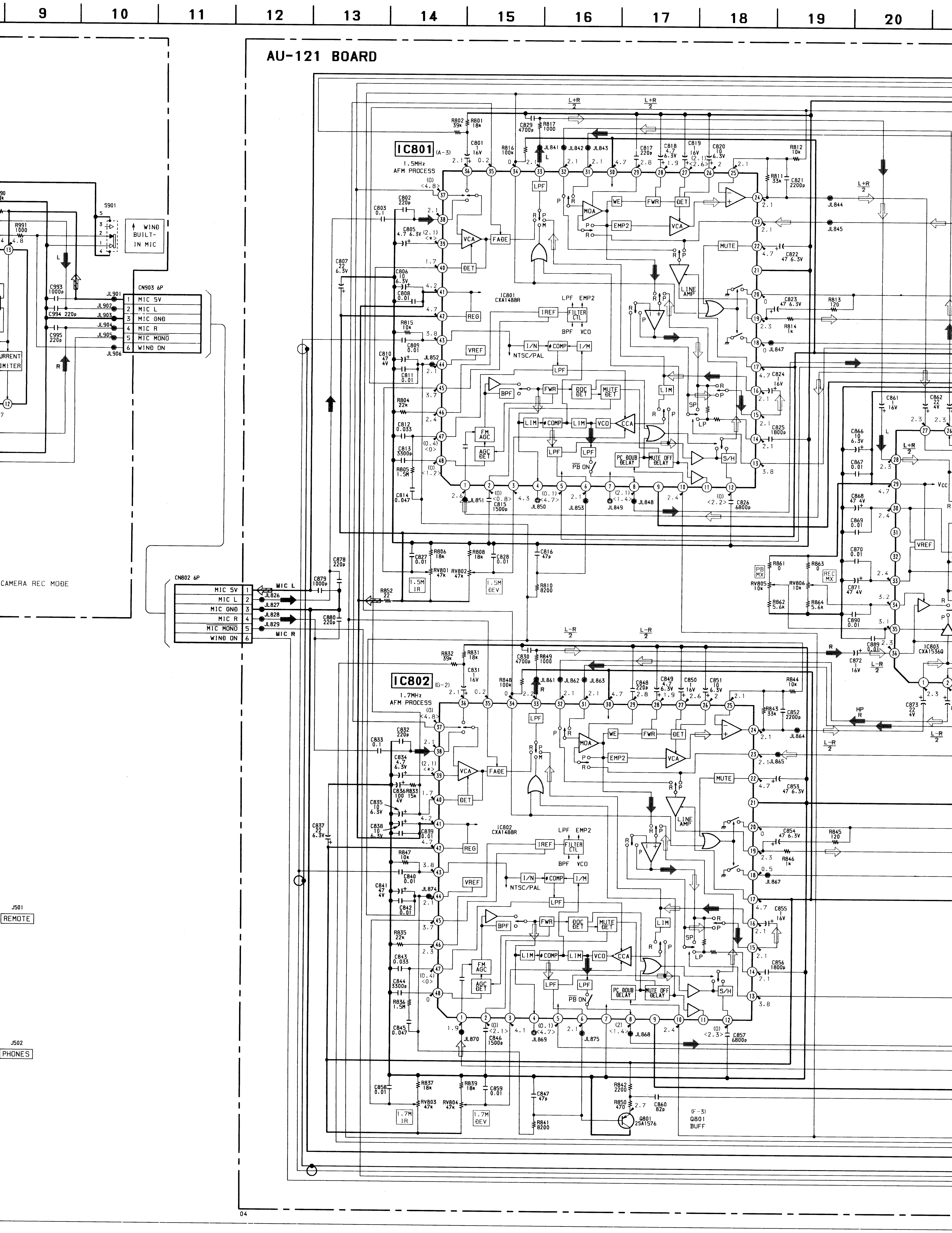
—Ref. No. AU-121, HL-4, MA-116 and RM-56 BOARDS : 6000 series—

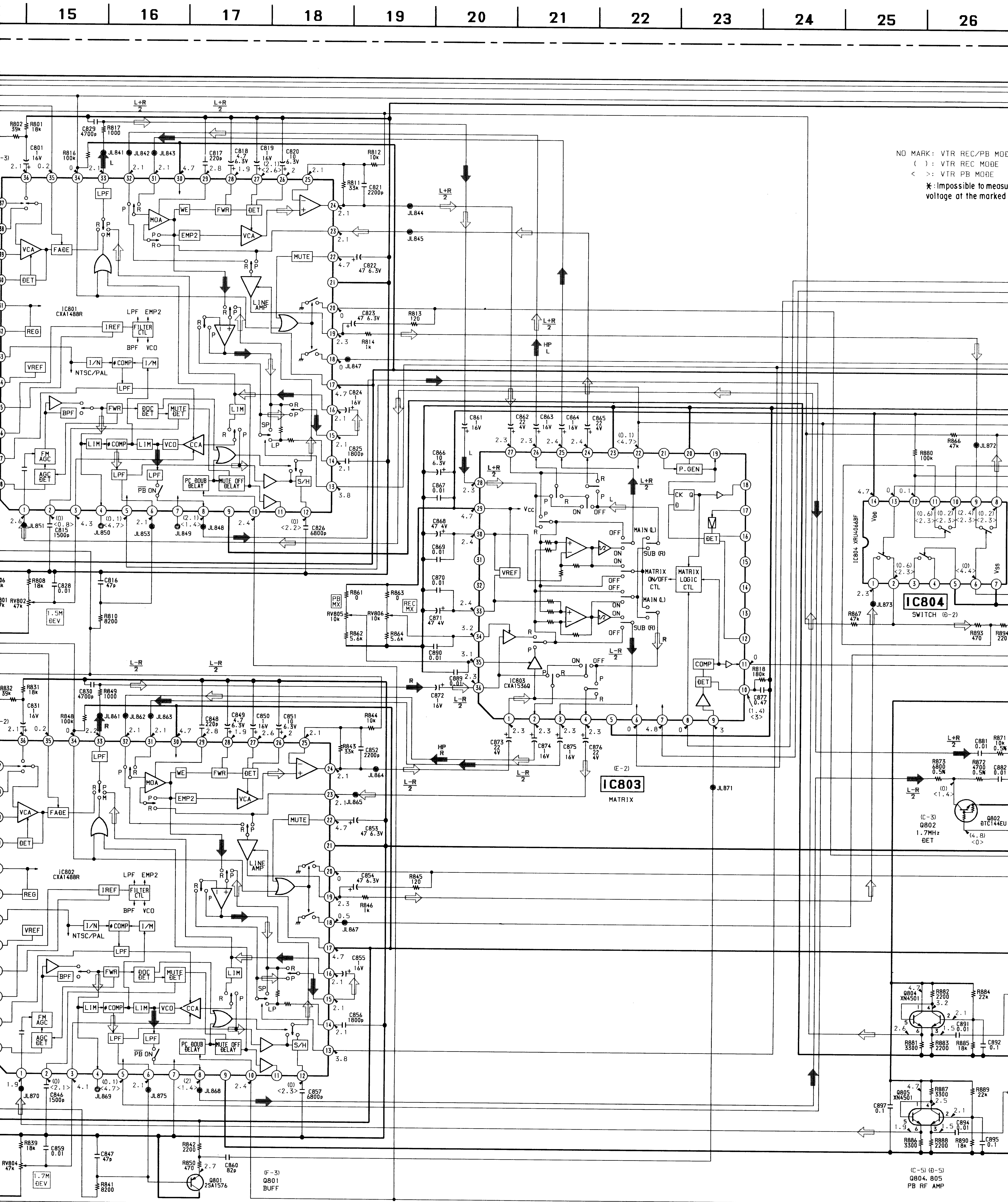


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
MA-116 BOARD
INT MIC L
CN901 4P
MIC L GND
INT MIC L
INT MIC L
MIC L GND
JL911
Q901 2SC4211
Q902 2SA1622
(B-2) (B-2)
Q901, 902
MATRIX AMP
Q905 (1/2) FC101 EQ
Q905 (2/2) FC101 BUFF
(B-1) Q905
LAND902
(E-1)
IC901
MIC AMP
J901
MIC (PLUG IN) POWER
JL922
JL912
D901 MA110
LAND905
CHASSIS GND
IC901 LA7470M
SL1
SL2
SR1
SR2
BIAS
Vcc
CURRENT LIMITER
S901
WIND BUILT-IN MIC
CN903 6P
MIC 5V
MIC L
MIC GND
MIC R
MIC MON
WIND ON
JL901
JL902
JL903
JL904
JL905
JL906
L
R
(B-3) (B-4)
Q903, 904
MATRIX AMP
INT MIC R
CN902 4P
MIC R GND
INT MIC R
INT MIC R
MIC R GND
JL921
JL923
Q903 2SC4211
Q904 2SA1622
Q906 (1/2) FC101 EQ
Q906 (2/2) FC101 BUFF
LAND903
(E-3) Q906
NO MARK: CAMERA REC MODE
04
RM-56 BOARD
CN401 3P
SIRCS IN
SIRCS VDD
SS GND
JL401
JL402
JL403
IC401 SBX1621-51
SIRCS
VDD
GND
IC401
REMOTE CONTROL RECEIVER
HL-4 BOARD
CN501 5P
TO CONTROL SW BLOCK (CF-3) CN902 (See page 130.)
SIRCS IN
LANC SIG
SS GND
SIRCS VDD
LANC DC
J501
REMOTE
D502 RD12MB2
D501 MA8082M
C501 1000p
C503 1000p
CN502 2P
CHASSIS GND
CHASSIS GND
CHASSIS
D507 DAN202U
D503 MA8082M
D505 MA8082M
D504 MA8082M
D506 MA8082M
J502
PHONES
CN503 7P
SIRCS IN
SIRCS VDD
SS GND
N.C
HEADPHONE L
HEADPHONE GND
HEADPHONE R
C505 1000p
C506 1000p

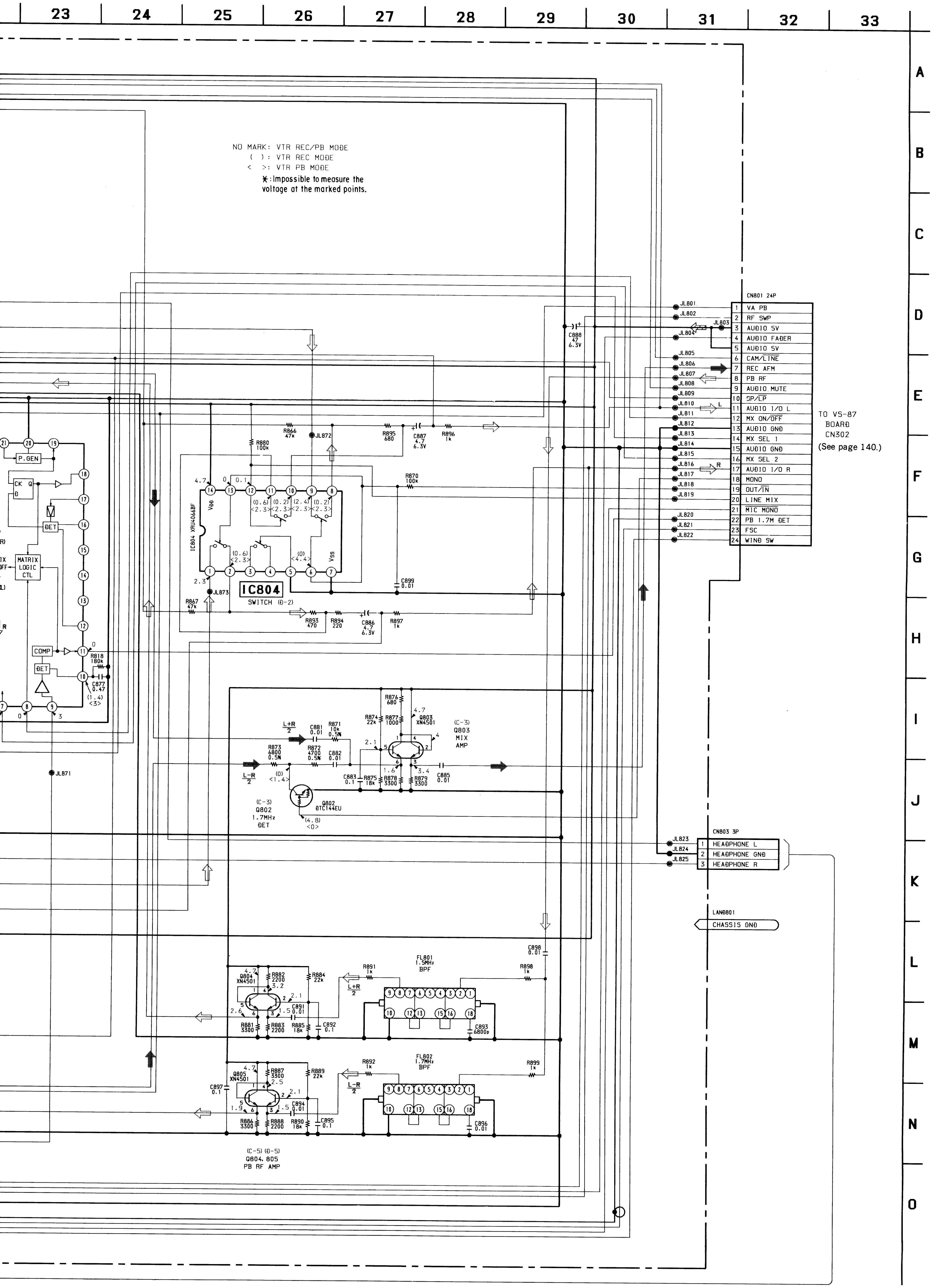
• Signal path

	AUDIO Signal
REC	➡
PB	⇨


9
10
11
12
13
14
15
16
17
18
19
20
AU-121 BOARD
IC801 (A-3)
1.5MHz
AFM PROCESS
IC801
CXA1488R
IC802 (G-2)
1.7MHz
AFM PROCESS
IC802
CXA1488R
IC803
CXA1536Q
CN903 6P
MIC 5V
MIC L
MIC GND
MIC R
MIC MONO
WIND ON
CN802 6P
MIC 5V
MIC L
MIC GND
MIC R
MIC MONO
WIND ON
MIC L
MIC R
S901
WIND
BUILT-
IN MIC
CAMERA REC MODE
CURRENT
LIMITER
J501
REMOTE
J502
PHONES
L+R/2
L-R/2
LPF
VCA
FADE
DET
REG
VREF
MOA
WE
FWR
EMP2
MUTE
LINE AMP
IREF
FILTER CTL
BPF
VCO
I/N
COMP
I/M
NTSC/PAL
DOC DET
MUTE DET
FM AGC
AGC DET
LIM
CCA
PB ON
PC DOUB DELAY
MUTE OFF DELAY
S/H
SP
LP
1.5M IR
1.5M DEV
1.7M IR
1.7M DEV
PB MX
REC MX
RV801 47k
RV802 47k
RV803 47k
RV804 47k
RV805 10k
RV806 10k
Q801
2SA1576
(F-3)
Q801
BUFF
HP R
Vcc
04

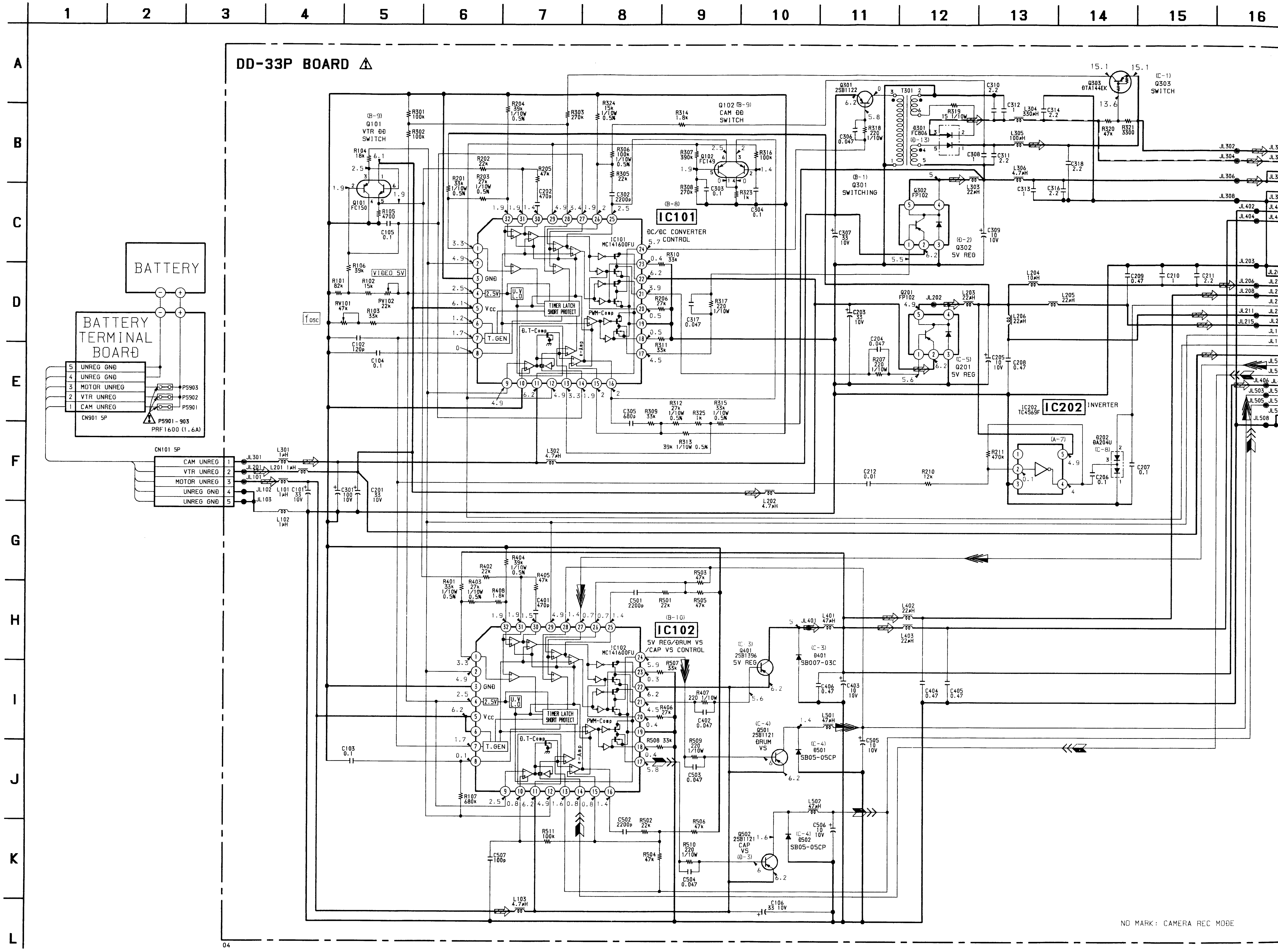

15
16
17
18
19
20
21
22
23
24
25
26
IC801
CXA1488R
IC802
CXA1488R
IC803
CXA1536Q
(E-2)
MATRIX
IC804 XRU4066BF
SWITCH (D-2)
(F-3)
Q801
2SA1576
BUFF
(C-3)
Q802
DTC144EU
1.7MHz
DET
(C-5) (D-5)
Q804, 805
XN4501
PB RF AMP
L+R/2
L-R/2
HP L
HP R
MATRIX ON/OFF CTL
MATRIX LOGIC CTL
MAIN (L)
SUB (R)
P.GEN
VREF
COMP
DET
LINE AMP
MUTE
FADE
VCA
LPF
BPF
FWR
REG
IREF
FILTER CTL
NTSC/PAL
DOC DET
MUTE DET
LIM
VCO
CCA
FM AGC
AGC DET
PC DOUB DELAY
MUTE OFF DELAY
S/H
MOA
WE
EMP2
PB ON
PB MX
REC MX
1.5M DEV
1.7M DEV

NO MARK: VTR REC/PB MODE
( ): VTR REC MODE
< >: VTR PB MODE
✱: Impossible to measu
voltage at the marked

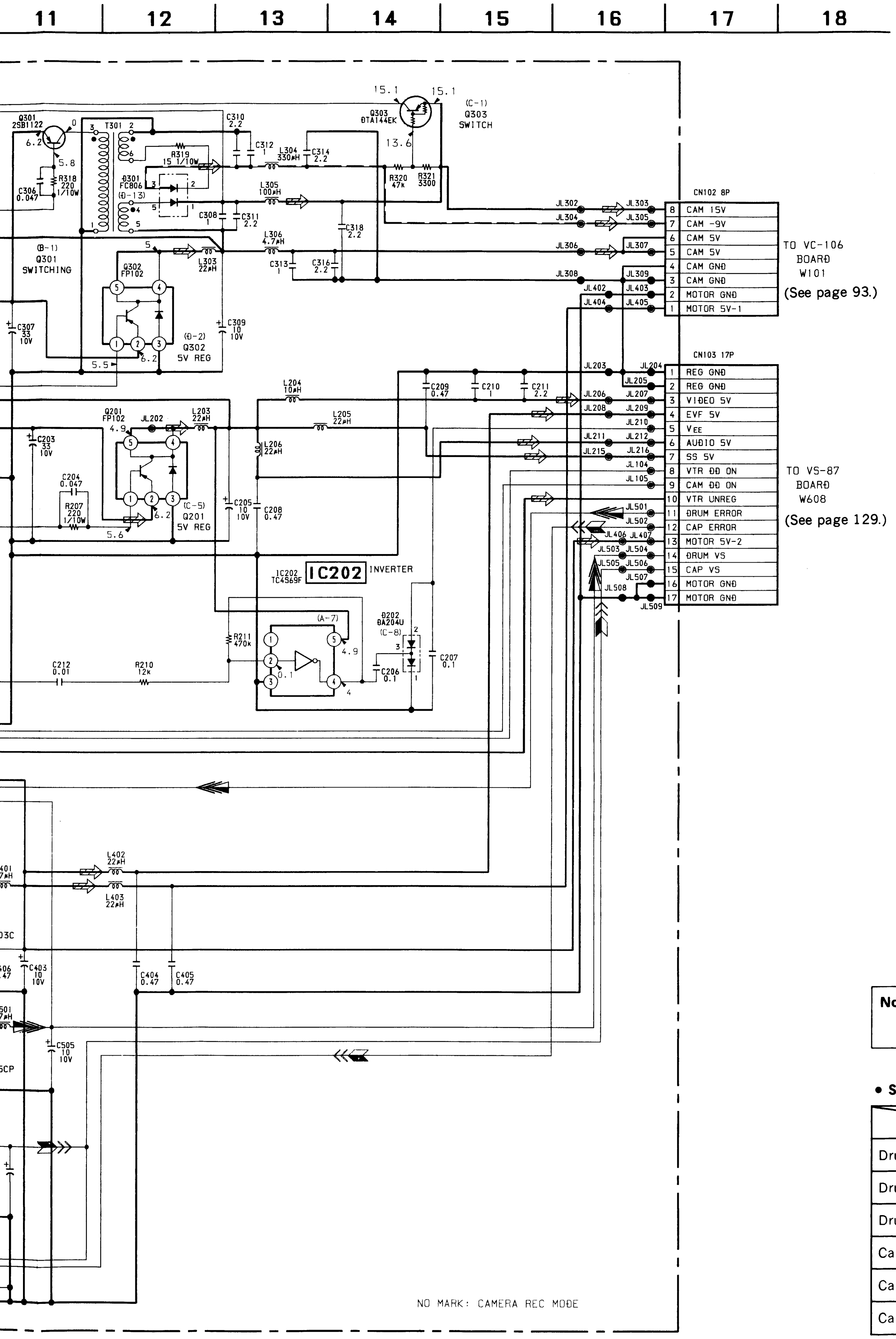

23
24
25
26
27
28
29
30
31
32
33
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
NO MARK: VTR REC/PB MODE
( ): VTR REC MODE
< >: VTR PB MODE
✱: Impossible to measure the voltage at the marked points.
CN801 24P
1 VA PB
2 RF SWP
3 AUDIO 5V
4 AUDIO FADER
5 AUDIO 5V
6 CAM/LINE
7 REC AFM
8 PB RF
9 AUDIO MUTE
10 SP/LP
11 AUDIO I/O L
12 MX ON/OFF
13 AUDIO GND
14 MX SEL 1
15 AUDIO GND
16 MX SEL 2
17 AUDIO I/O R
18 MONO
19 OUT/IN
20 LINE MIX
21 MIC MONO
22 PB 1.7M DET
23 FSC
24 WIND SW
TO VS-87 BOARD CN302 (See page 140.)
CN803 3P
1 HEADPHONE L
2 HEADPHONE GND
3 HEADPHONE R
LAND801
CHASSIS GND
IC804
IC804 XRU4066BF
SWITCH (D-2)
VDD
VSS
P.GEN
CK Q
D
DET
MATRIX LOGIC CTL
COMP
R818 180k
C877 0.47
JL871
JL872
JL873
R866 47k
R880 100k
R895 680
C887 4.7 6.3V
R896 1k
R870 100k
C899 0.01
R867 47k
R893 470
R894 220
C886 4.7 6.3V
R897 1k
C888 47 6.3V
L+R/2
L-R/2
C881 0.01
R871 10k 0.5%
R873 6800 0.5%
R872 4700 0.5%
C882 0.01
R876 680
R874 22k
R877 1000
Q803 XN4501
(C-3) Q803 MIX AMP
C883 0.1
R875 18k
R878 3300
R879 3300
C885 0.01
(C-3) Q802 1.7MHz DET
Q802 DTC144EU
FL801 1.5MHz BPF
R891 1k
R898 1k
C898 0.01
Q804 XN4501
R882 2200
R884 22k
C891 0.01
R881 3300
R883 2200
R885 18k
C892 0.1
C893 6800p
FL802 1.7MHz BPF
R892 1k
R899 1k
Q805 XN4501
R887 3300
R889 22k
C897 0.1
C894 0.01
R886 3300
R888 2200
R890 18k
C895 0.1
C896 0.01
(C-5) (D-5) Q804, 805 PB RF AMP

DD-33P (DC-DC CONVERTER, DRUM/CAPSTAN VS) SCHEMATIC DIAGRAM

—Ref. No. DD-33P BOARD : 3000 series—

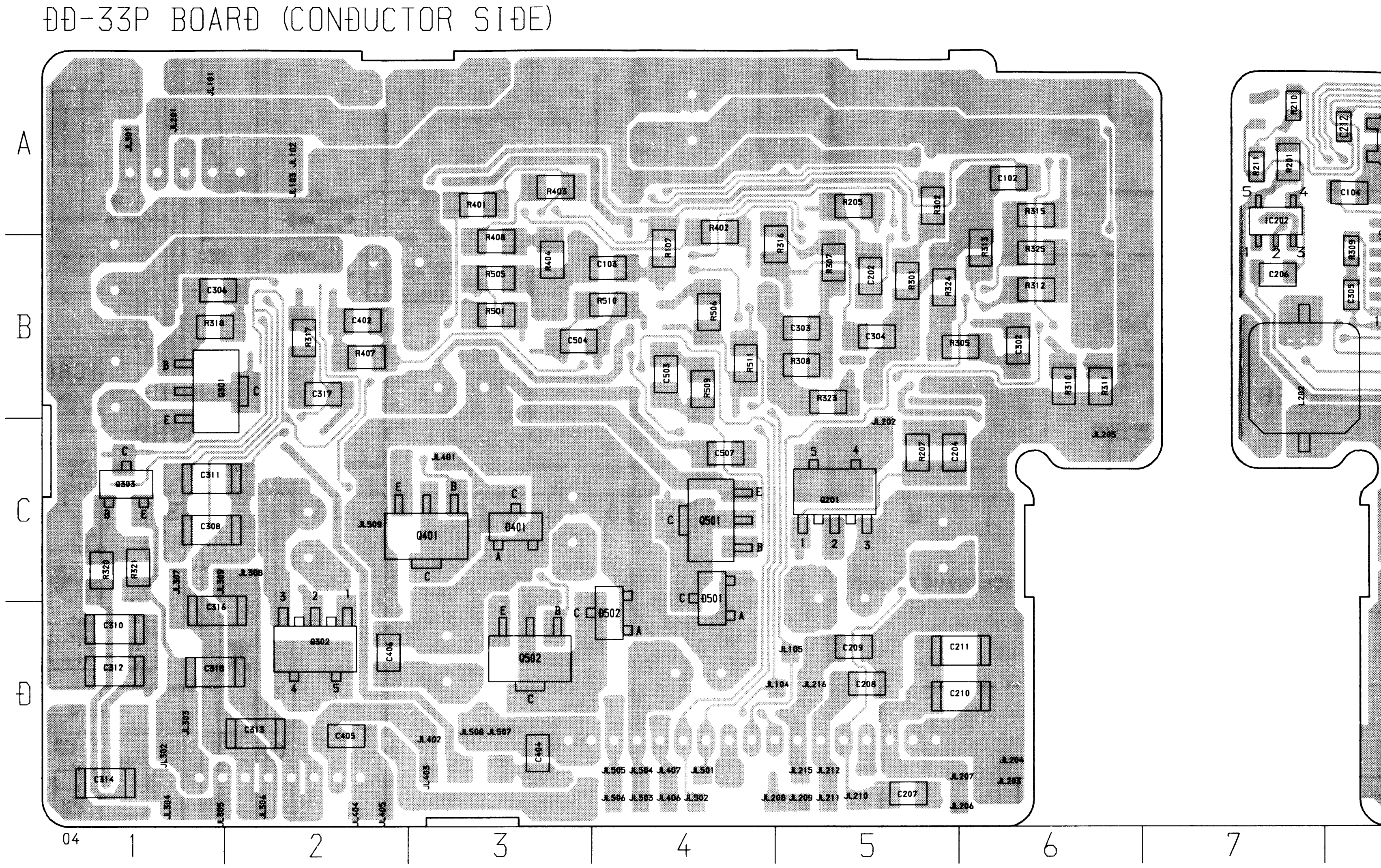


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
A B C D E F G H I J K L
DD-33P BOARD ⚠
BATTERY
BATTERY TERMINAL BOARD
5 UNREG GND
4 UNREG GND
3 MOTOR UNREG
2 VTR UNREG
1 CAM UNREG
CN901 5P
PS903
PS902
PS901
⚠ PS901 - 903 PRF1600 (1.6A)
CN101 5P
CAM UNREG 1
VTR UNREG 2
MOTOR UNREG 3
UNREG GND 4
UNREG GND 5
JL301
L301 1μH
JL201
L201 1μH
JL101
JL102
JL103
L101 1μH
C101 33 10V
L102 1μH
C301 100 10V
C201 33 10V
(B-9) Q101 VTR DD SWITCH
Q101 FC150
R104 18k
R105 4700
C105 0.1
R106 39k
R101 82k
R102 15k
RV101 47k
RV102 22k
R103 33k
VIDEO 5V
f OSC
C102 120p
C104 0.1
R301 100k
R302 100k
R204 39k 1/10W 0.5%
R303 270k
R324 15k 1/10W 0.5%
R314 1.8k
Q102 (B-9) CAM DD SWITCH
R202 22k
R201 33k 1/10W 0.5%
R203 27k 1/10W 0.5%
R205 47k
C202 470p
R306 100k 1/10W 0.5%
R305 22k
C302 2200p
R307 390k
Q102 FC149
R316 100k
R308 270k
C303 0.1
R323 1k
C304 0.1
(B-8)
IC101
DC/DC CONVERTER CONTROL
IC101 MC141600FU
GND
2.5V
U.V L.O
Vcc
T.GEN
TIMER LATCH SHORT PROTECT
PWM-Comp
D.T-Comp
R310 33k
R206 27k
R317 220 1/10W
C317 0.047
R311 33k
C305 680p
R309 33k
R312 27k 1/10W 0.5%
R325 1k
R315 33k 1/10W 0.5%
R313 39k 1/10W 0.5%
L302 4.7μH
L202 4.7μH
Q301 2SB1122
T301
R318 220 1/10W
C306 0.047
D301 FC806 (D-13)
R319 15 1/10W
C310 2.2
C312 1
L304 330μH
C314 2.2
Q303 DTA144EK
(C-1) Q303 SWITCH
R320 47k
R321 3300
L305 100μH
C308 1
C311 2.2
L306 4.7μH
C318 2.2
(B-1) Q301 SWITCHING
Q302 FP102
L303 22μH
C313 1
C316 2.2
C307 33 10V
C309 10 10V
(D-2) Q302 5V REG
L204 10μH
C209 0.47
C210 1
C211 2.2
Q201 FP102
JL202
L203 22μH
L205 22μH
C203 33 10V
L206 22μH
C204 0.047
R207 220 1/10W
(C-5) Q201 5V REG
C205 10 10V
C208 0.47
IC202 TC4S69F
IC202 INVERTER
(A-7)
D202 DA204U (C-8)
R211 470k
C206 0.1
C207 0.1
C212 0.01
R210 12k
JL302 JL304 JL306 JL308 JL402 JL404 JL203 JL206 JL208 JL211 JL215 JL406 JL503 JL505 JL508
R404 39k 1/10W 0.5%
R402 22k
R401 33k 1/10W 0.5%
R403 27k 1/10W 0.5%
R408 1.8k
R405 47k
C401 470p
C501 2200p
R501 22k
R505 47k
R503 47k
(B-10)
IC102
5V REG/DRUM VS /CAP VS CONTROL
IC102 MC141600FU
R507 33k
R407 220 1/10W
R406 27k
C402 0.047
R508 33k
R509 220 1/10W
C503 0.047
C103 0.1
R107 680k
C502 2200p
R502 22k
R506 47k
R511 100k
R510 220 1/10W
C504 0.047
R504 47k
C507 100p
L103 4.7μH
C106 33 10V
JL401
L401 47μH
L402 22μH
L403 22μH
(C-3) Q401 2SB1396 5V REG
(C-3) D401 SB007-03C
C406 0.47
C403 10 10V
C404 0.47
C405 0.47
(C-4) Q501 2SB1121 DRUM VS
L501 47μH
(C-4) D501 SB05-05CP
C505 10 10V
L502 47μH
Q502 2SB1121 CAP VS (B-3)
C506 10 10V
(C-4) D502 SB05-05CP
NO MARK: CAMERA REC MODE
04


11
12
13
14
15
16
17
18
Q301 2SB1122
T301
Q301 SWITCHING
Q302 FP102
(D-2) Q302 5V REG
Q303 DTA144EK
(C-1) Q303 SWITCH
D301 FC806
CN102 8P
8 CAM 15V
7 CAM -9V
6 CAM 5V
5 CAM 5V
4 CAM GND
3 CAM GND
2 MOTOR GND
1 MOTOR 5V-1
TO VC-106 BOARD W101
(See page 93.)
CN103 17P
1 REG GND
2 REG GND
3 VIDEO 5V
4 EVF 5V
5 VEE
6 AUDIO 5V
7 SS 5V
8 VTR DD ON
9 CAM DD ON
10 VTR UNREG
11 DRUM ERROR
12 CAP ERROR
13 MOTOR 5V-2
14 DRUM VS
15 CAP VS
16 MOTOR GND
17 MOTOR GND
TO VS-87 BOARD W608
(See page 129.)
Q201 FP102
(C-5) Q201 5V REG
IC202 TC4S69F
IC202 INVERTER
D202 DA204U
NO MARK: CAMERA REC MODE

DD-33P (DC-DC CONVERTER, DRUM/CAPSTAN VS) PRINTED WIRING BOARD

—Ref. No. DD-33P BOARD : 3000 series—


DD-33P BOARD (CONDUCTOR SIDE)
A
B
C
D
1
2
3
4
5
6
7
04

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- **Signal path**

	REC	REC/PB	PB
Drum speed servo		▻	
Drum phase servo		⊳	
Drum servo(speed and phase)		⋙	
Capstan speed servo		▶	
Capstan phase servo	➤›	➢›	▷›
Capstan servo(speed and phase)		➢››	

< DIODE >

D202	8-719-941-23	DA204U
D301	8-719-989-33	FC806
D401	8-719-941-04	SB007-03CP
D501	8-719-938-75	SB05-05CP
D502	8-719-938-75	SB05-05CP

< IC >

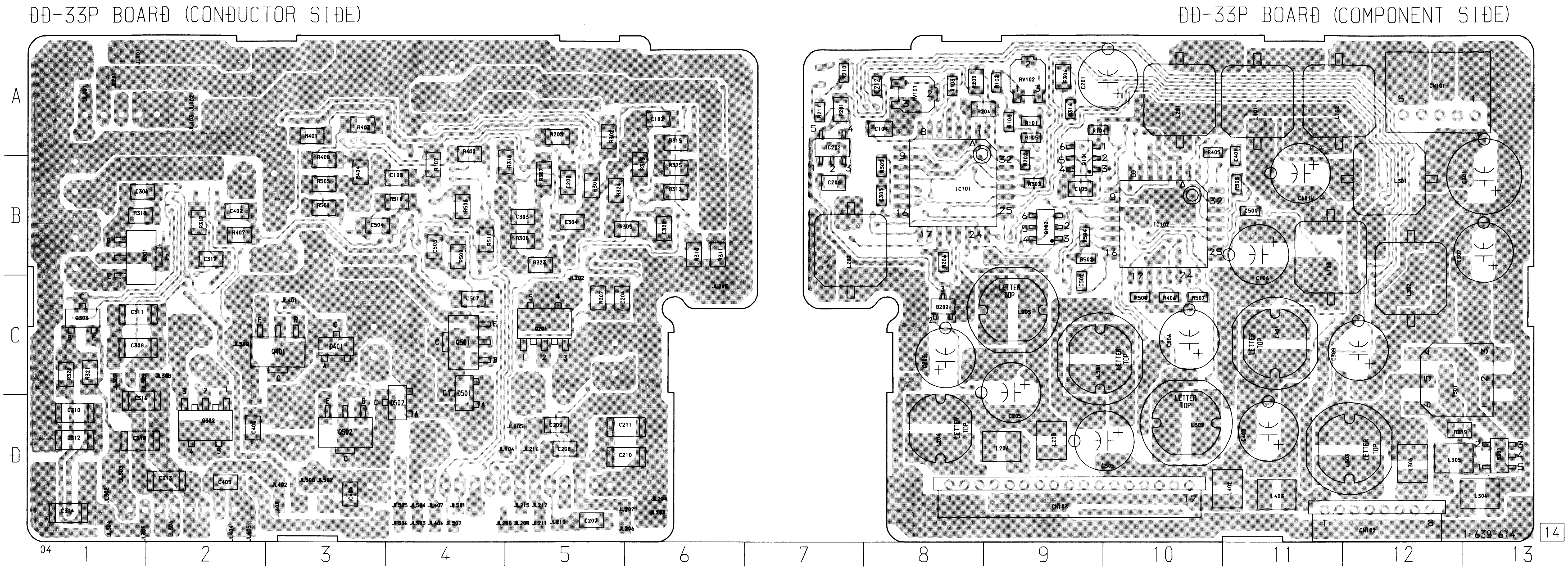
IC101	8-759-035-98	MC141600FU
IC102	8-759-035-98	MC141600FU
IC202	8-759-209-57	TC4S69F

< TRANSISTOR >

Q101	8-729-823-93	FC150
Q102	8-729-823-95	FC149
Q201	8-729-823-84	FP102
Q301	8-729-804-41	2SB1122-S
Q302	8-729-823-84	FP102
Q303	8-729-901-06	DTA144EK
Q401	8-729-012-63	2SB1396-S/T/U
Q501	8-729-805-25	2SB1121
Q502	8-729-805-25	2SB1121

DD-33P (DC-DC CONVERTER, DRUM/CAPSTAN VS) PRINTED WIRING BOARD

—Ref. No. DD-33P BOARD : 3000 series—


DD-33P BOARD (CONDUCTOR SIDE)
DD-33P BOARD (COMPONENT SIDE)
A
B
C
D
04
1
2
3
4
5
6
7
8
9
10
11
12
13
14
1-639-614-
JL101
JL301
JL201
JL102
JL103
C102
R401
R403
R205
R302
R315
R408
R402
R316
R325
R505
R404
C103
R107
R307
C202
R301
R324
R313
R312
C306
R501
R510
R506
C303
C304
R305
C302
R318
R317
C402
C504
R308
R511
R407
C503
R509
R310
R311
D301
C317
R323
JL202
JL205
JL401
C507
R207
C204
Q303
C311
Q201
C308
JL509
Q401
D401
Q501
R320
R321
JL307
JL309
JL308
C316
Q302
D502
D501
C310
C406
Q502
C312
C318
JL105
C209
C211
JL104
JL216
C208
C210
C313
C405
JL402
JL508
JL507
C404
C314
JL302
JL303
JL304
JL305
JL306
JL404
JL405
JL403
JL505
JL504
JL407
JL501
JL506
JL503
JL406
JL502
JL215
JL212
JL208
JL209
JL211
JL210
C207
JL204
JL207
JL203
JL206
R210
C212
RV101
R103
R203
R102
RV102
R306
C201
R211
R201
C108
R204
R104
R314
L201
L101
L102
CN101
IC202
IC101
R101
R105
R104
Q101
R405
C401
R202
R303
C105
C206
R309
C305
Q102
IC102
R503
C501
C101
L301
C301
L202
R206
R502
C502
R504
C106
L103
C307
L302
D202
L203
R508
R406
R507
LETTER TOP
C203
C205
L501
C506
L401
C509
T501
L204
L206
L205
C505
L502
C405
L503
R319
L306
L305
Q301
L402
L403
L304
CN103
CN102
1
17
8

< DIODE >		
D202	8-719-941-23	DA204U
D301	8-719-989-33	FC806
D401	8-719-941-04	SB007-03CP
D501	8-719-938-75	SB05-05CP
D502	8-719-938-75	SB05-05CP
< IC >		
IC101	8-759-035-98	MC141600FU
IC102	8-759-035-98	MC141600FU
IC202	8-759-209-57	TC4S69F
< TRANSISTOR >		
Q101	8-729-823-93	FC150
Q102	8-729-823-95	FC149
Q201	8-729-823-84	FP102
Q301	8-729-804-41	2SB1122-S
Q302	8-729-823-84	FP102
Q303	8-729-901-06	DTA144EK
Q401	8-729-012-63	2SB1396-S/T/U
Q501	8-729-805-25	2SB1121
Q502	8-729-805-25	2SB1121

components identified by mark ⚠ or dotted
with mark ⚠ are critical for safety.
ace only with part number specified.

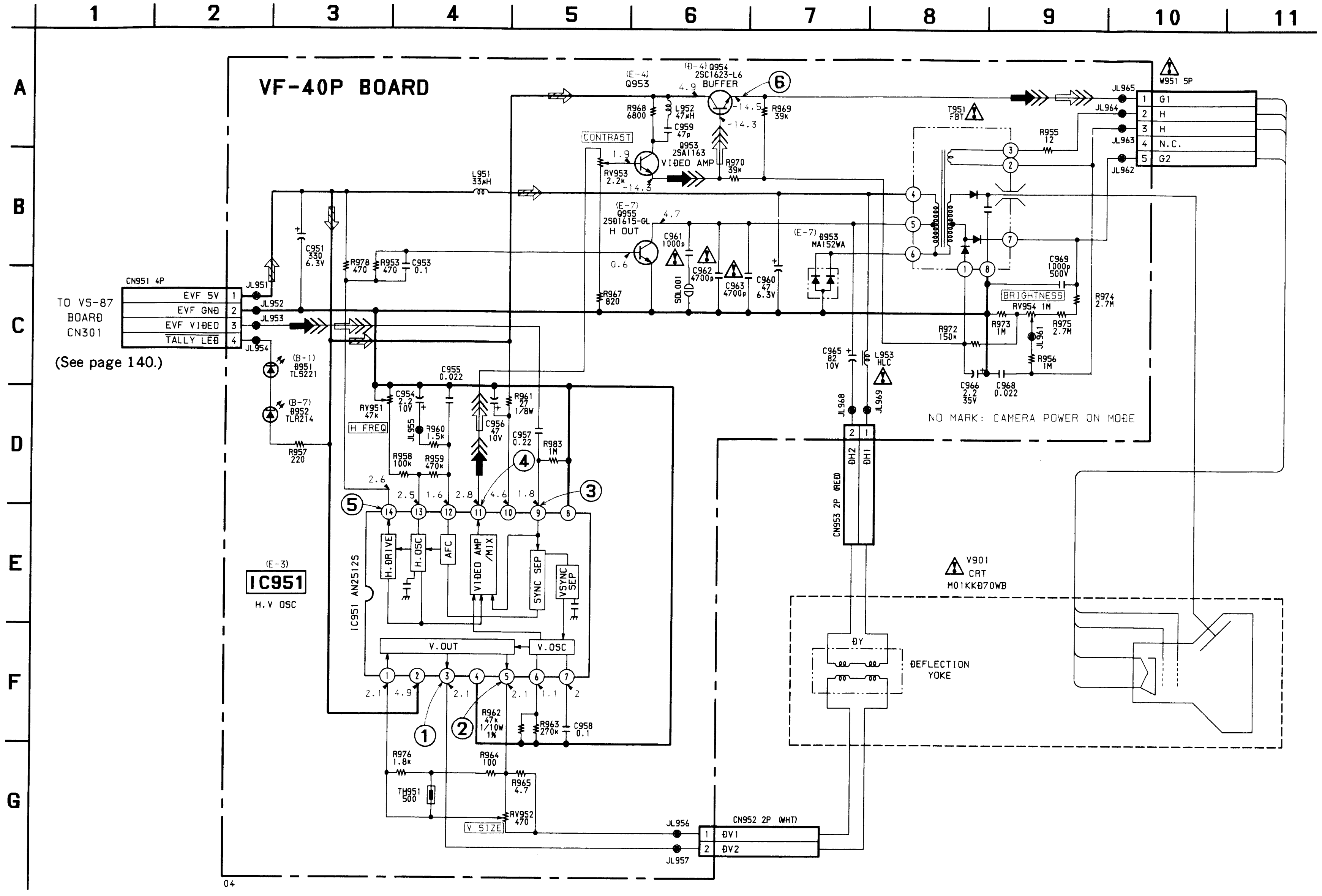
n

	REC	REC/PB	PB
servo		▷	
servo		▷>	
speed and phase)		▷>>	
ed servo		▷	
se servo	▶〉	▷〉	▷〉
o(speed and phase)		▷〉〉	

DC-DC CONVERTER DC-DC CONVERTER

VF-40P (VIEW FINDER) SCHEMATIC DIAGRAM

—Ref. No. VF-40P BOARD : 7000 series—


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
VF-40P BOARD
TO VS-87 BOARD CN301
(See page 140.)
CN951 4P
EVF 5V
EVF GND
EVF VIDEO
TALLY LED
JL951
JL952
JL953
JL954
D951 TLS221
D952 TLR214
R957 220
L951 33µH
C951 330 6.3V
R978 470
R953 470
C953 0.1
Q953 2SA1163 VIDEO AMP
Q954 2SC1623-L6 BUFFER
R968 6800
L952 47µH
C959 47p
R969 39k
R970 39k
CONTRAST
RV953 2.2k
Q955 2SD1615-GL H OUT
C961 1000p
C962 4700p
C963 4700p
C960 47 6.3V
R967 820
SOL001
D953 MA152WA
T951 FBT
R955 12
C969 1000p 500V
BRIGHTNESS
RV954 1M
R972 150k
R973 1M
R974 2.7M
R975 2.7M
R956 1M
C966 2.2 35V
C968 0.022
C965 82 10V
L953 HLC
JL961
JL962
JL963
JL964
JL965
JL968
JL969
W951 5P
G1
H
H
N.C.
G2
NO MARK: CAMERA POWER ON MODE
CN953 2P (RED)
DH2
DH1
V901 CRT M01KKØ70WB
DY
DEFLECTION YOKE
IC951
H.V OSC
IC951 AN2512S
RV951 47k
H FREQ
C954 2.2 10V
C955 0.022
R958 100k
R959 470k
R960 1.5k
JL955
C956 47 10V
C957 0.22
R961 27 1/8W
R983 1M
H.DRIVE
H.OSC
AFC
VIDEO AMP /MIX
SYNC SEP
VSYNC SEP
V.OUT
V.OSC
R962 47k 1/10W 1N
R963 270k
C958 0.1
R976 1.8k
TH951 500
R964 100
R965 4.7
RV952 470
V SIZE
JL956
JL957
CN952 2P (WHT)
DV1
DV2
04

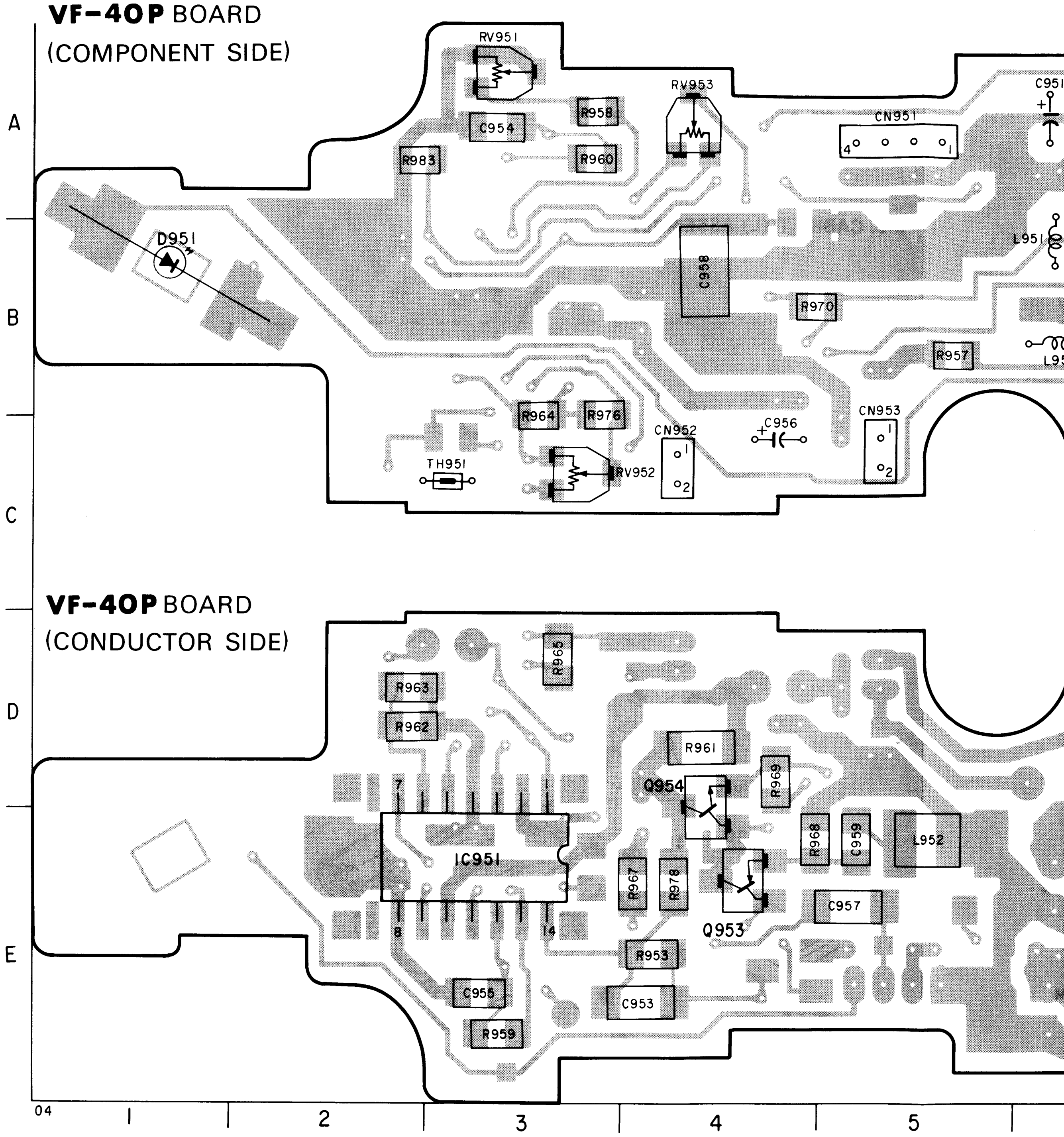
• Signal path

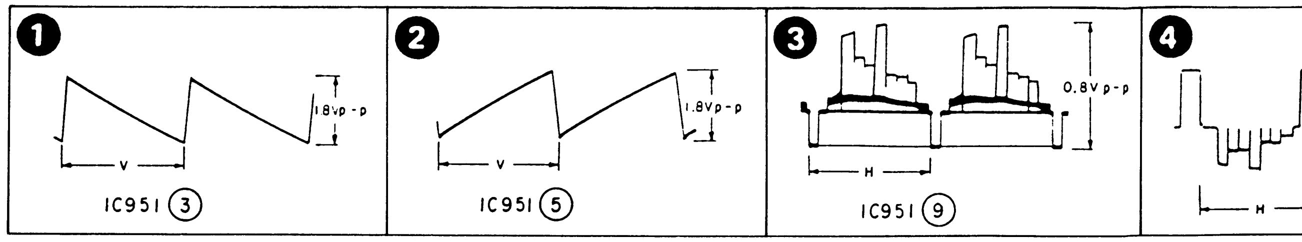
	VIDEO Signal		
	CHROMA	Y	Y/CHROMA
REC	➡	➡➡	➡➡➡
PB	⇨	⇨⇨	⇨⇨⇨

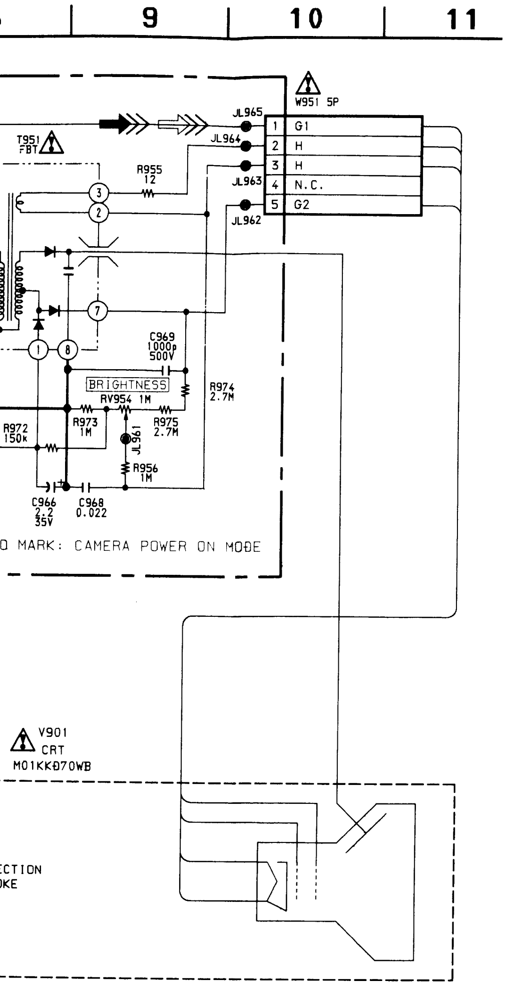
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

VF-40P (VIEW FINDER) PRINTED WIRING BOARD

—Ref. No. VF-40P BOARD : 7000 series—

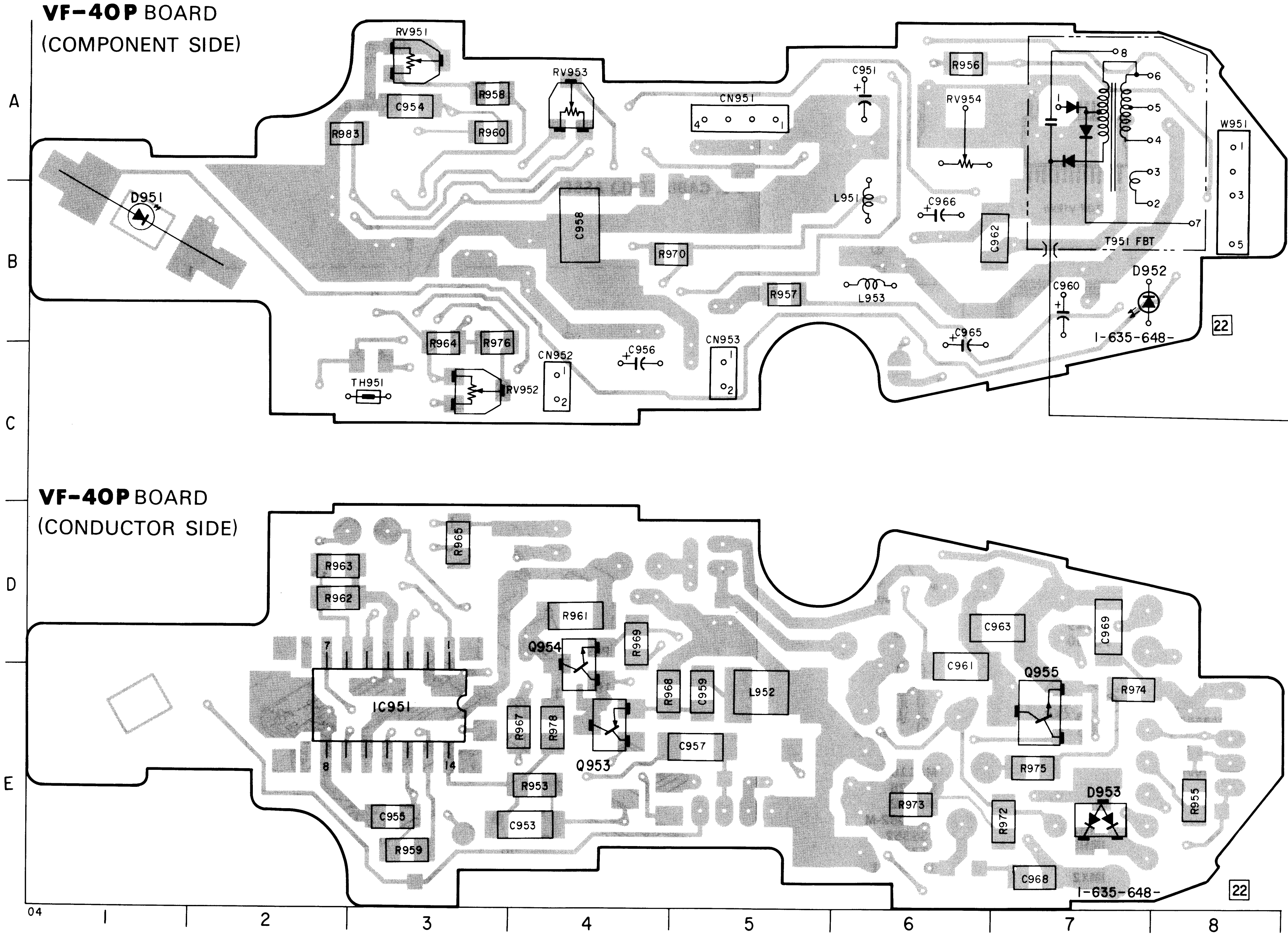

VF-40P BOARD (COMPONENT SIDE)
VF-40P BOARD (CONDUCTOR SIDE)
A
B
C
D
E
1
2
3
4
5
04
RV951
RV953
C954
R958
R960
R983
CN951
D951
C958
R970
R957
L951
R964
R976
RV952
TH951
CN952
C956
CN953
R965
R963
R962
R961
Q954
R969
IC951
R968
C959
L952
R967
R978
Q953
C957
R953
C955
C953
R959



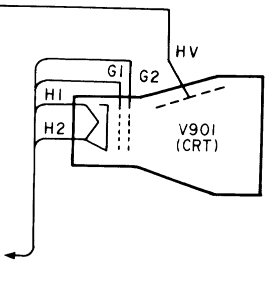

9
10
11
W951 5P
JL965
JL964
JL963
JL962
1 G1
2 H
3 H
4 N.C.
5 G2
T951 FBT
R955 12
C969 1000p 500V
BRIGHTNESS
RV954 1M
R974 2.7M
R972 150k
R973 1M
R975 2.7M
JL961
R956 1M
C966 2.2 35V
C968 0.022
MARK: CAMERA POWER ON MODE
V901 CRT M01KK070WB
CTION
KE

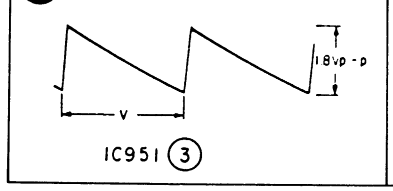
VF-40P (VIEW FINDER) PRINTED WIRING BOARD

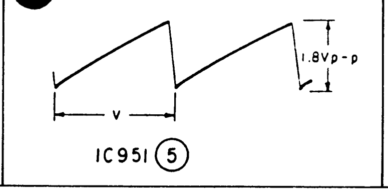
—Ref. No. VF-40P BOARD : 7000 series—

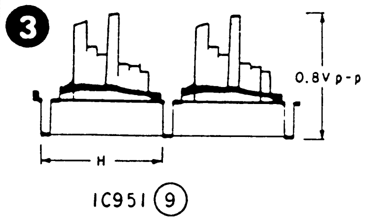

VF-40P BOARD
(COMPONENT SIDE)
VF-40P BOARD
(CONDUCTOR SIDE)
A
B
C
D
E
04
1
2
3
4
5
6
7
8
RV951
RV953
C954
R958
R960
R983
D951
C958
CN951
C951
R956
RV954
L951
C966
C962
T951 FBT
W951
R970
R957
L953
C960
D952
C965
1-635-648-
22
TH951
R964
R976
RV952
CN952
C956
CN953
R965
R963
R962
R961
Q954
R969
IC951
R967
R978
Q953
R968
C959
L952
C957
R953
C953
C955
R959
C963
C961
C969
Q955
R974
R975
R973
R972
D953
R955
C968

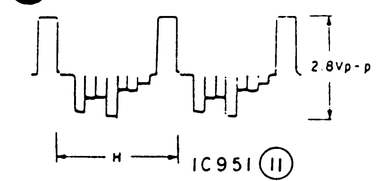
< DIODE >		
D951	8-719-820-65	TLS221
D952	8-719-984-02	BR4371F
D953	8-719-400-20	MA152WA-TX
< IC >		
IC951	8-759-420-01	AN2512S
< TRANSISTOR >		
Q953	8-729-216-22	2SA1162
Q954	8-729-100-67	2SC1623-L7
Q955	8-729-106-68	2SD1615A-GP

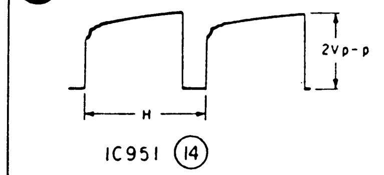

HV
G1
G2
H1
H2
V901
(CRT)
TO
VF-40PBOARD
W951

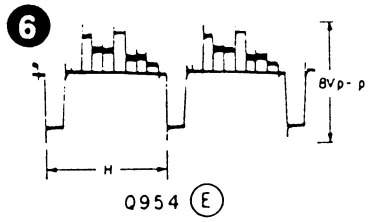
❶


❷


❸


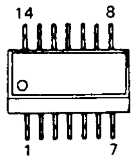
❹


❺


❻


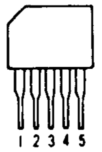
4-3. SEMICONDUCTORS

AN2512S

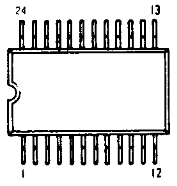


(TOP VIEW)

BA401

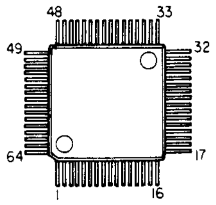


CXA1203N
CXA1393AN
CXL1507N
LA7470M

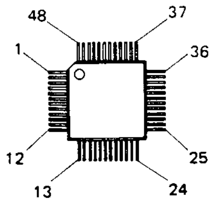


(TOP VIEW)

CXA1207R
CXA1391R
MB87818
MC68HC11L6SC400603

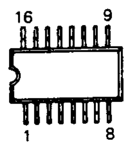

48
33
49
32
64
17
1
16

CXA1208R
CXA1234AR
CXA1481R
CXA1488R
CXA1592R
CXD2111R


48
37
1
36
12
25
13
24

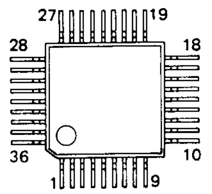
(TOP VIEW)

CXA1448N
CXD2107
MPC1726MR2
XRU4053BF



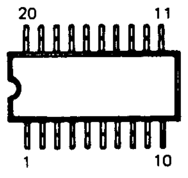
(TOP VIEW)

CXA1536Q
LB8110M


27
19
28
18
36
10
1
9

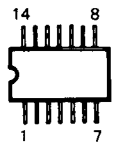
MARKING SIDE VIEW

CXA1609N
CXD2104AN
MB88341PFV
MB88346APFV
MB88352PFV
MB90071
MPC1724M
XRU5846FS



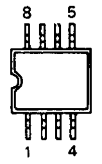
(TOP VIEW)

CXL1506M
LM324D
MC14066BF
TL1596CDB
XRU4066BF



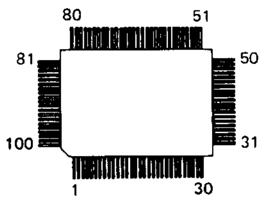
(TOP VIEW)

CXL5504M
LM358D
LM393D
RC3414M

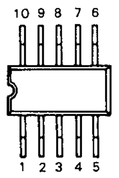


(TOP VIEW)

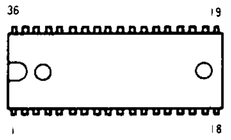
CXP80624


80
51
81
50
100
31
1
30

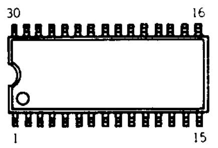
LB1830M


10 9 8 7 6
1 2 3 4 5

MCD002AM

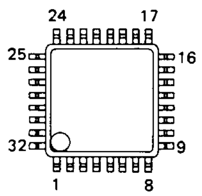


MCD004BM



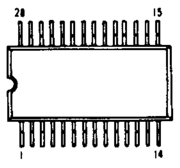
(TOP VIEW)

MC13400FUEB
MC141600FU


24
17
25
16
32
9
1
8

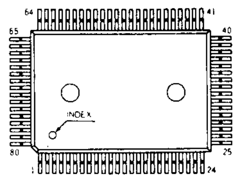
MARKING SIDE VIEW

MS6264CLL



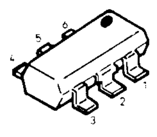
(TOP VIEW)

μPD75304GF

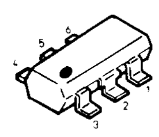

64
41
65
40
80
25
1
24
INDEX

MARKING SIDE VIEW

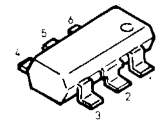
FC101



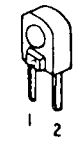
FC149
FC150



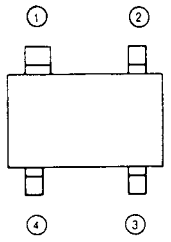
IMD2
IMH2
IMH8
IMX1
IMX2
IMZ1
XN4210
XN4501
XN4601
XN6215
XN6401
XN6501



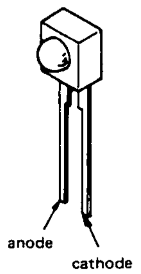
PT4850F



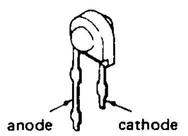
3SK248



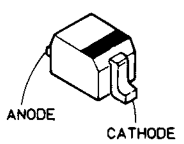
BR4371F


anode
cathode

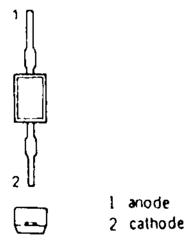
GL453


anode
cathode

MA110
MA728
MA732
MA8082-M
1SS352
1T32
1T33C-01


ANODE
CATHODE

TLS221


1
2
1 anode
2 cathode

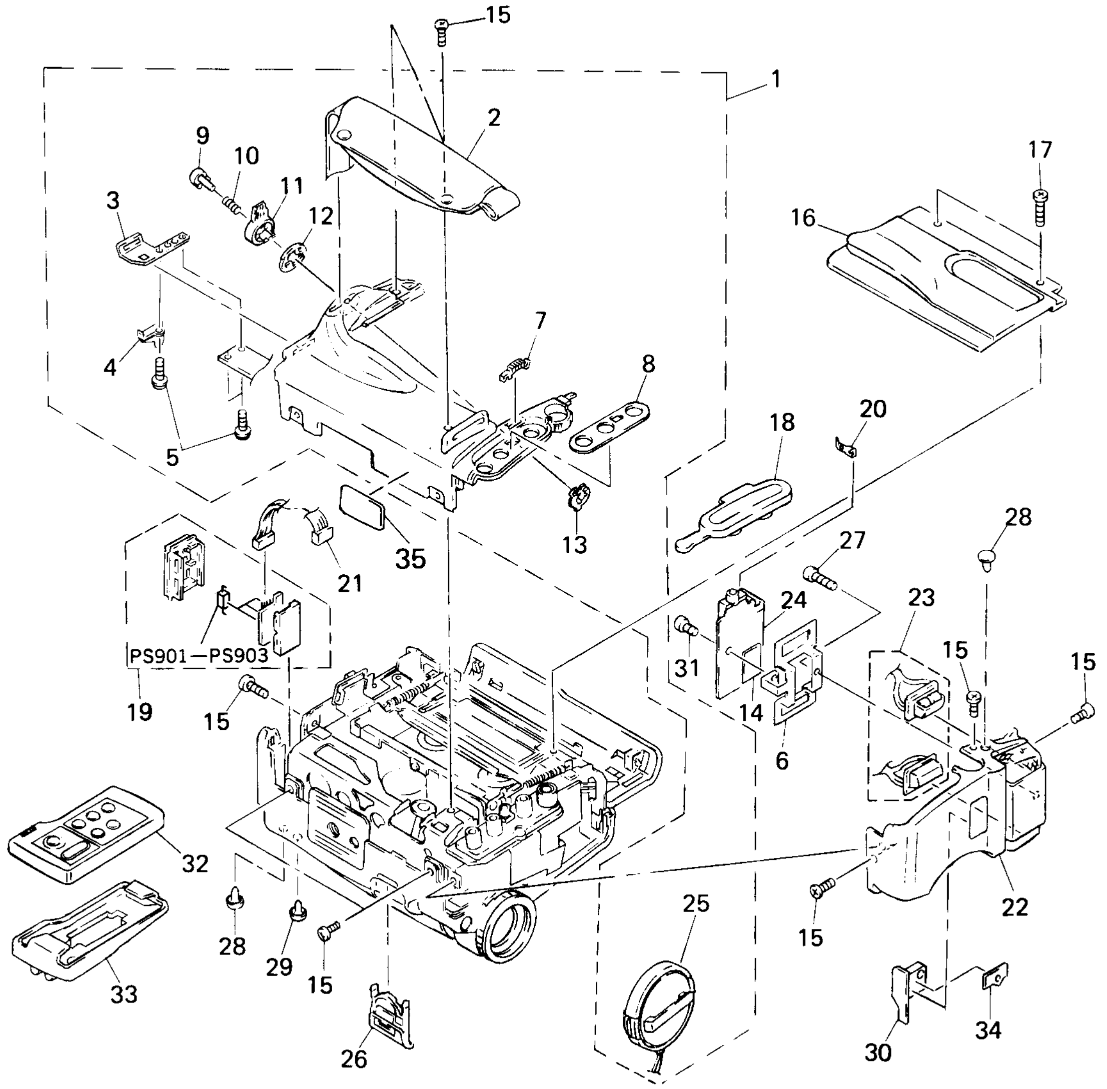
SECTION 5
EXPLODED VIEWS

NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE)...(RED)
  ↑ Parts Color ↑ Cabinet's Color
- Hardware(# mark) list is given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1. CABINET (L) ASSEMBLY


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
PS901—PS903

Ref. No.

1
1
2
3
4

5
6 *
7
7
8

9
10
11
12
13

14 *
15
16
17
18
19

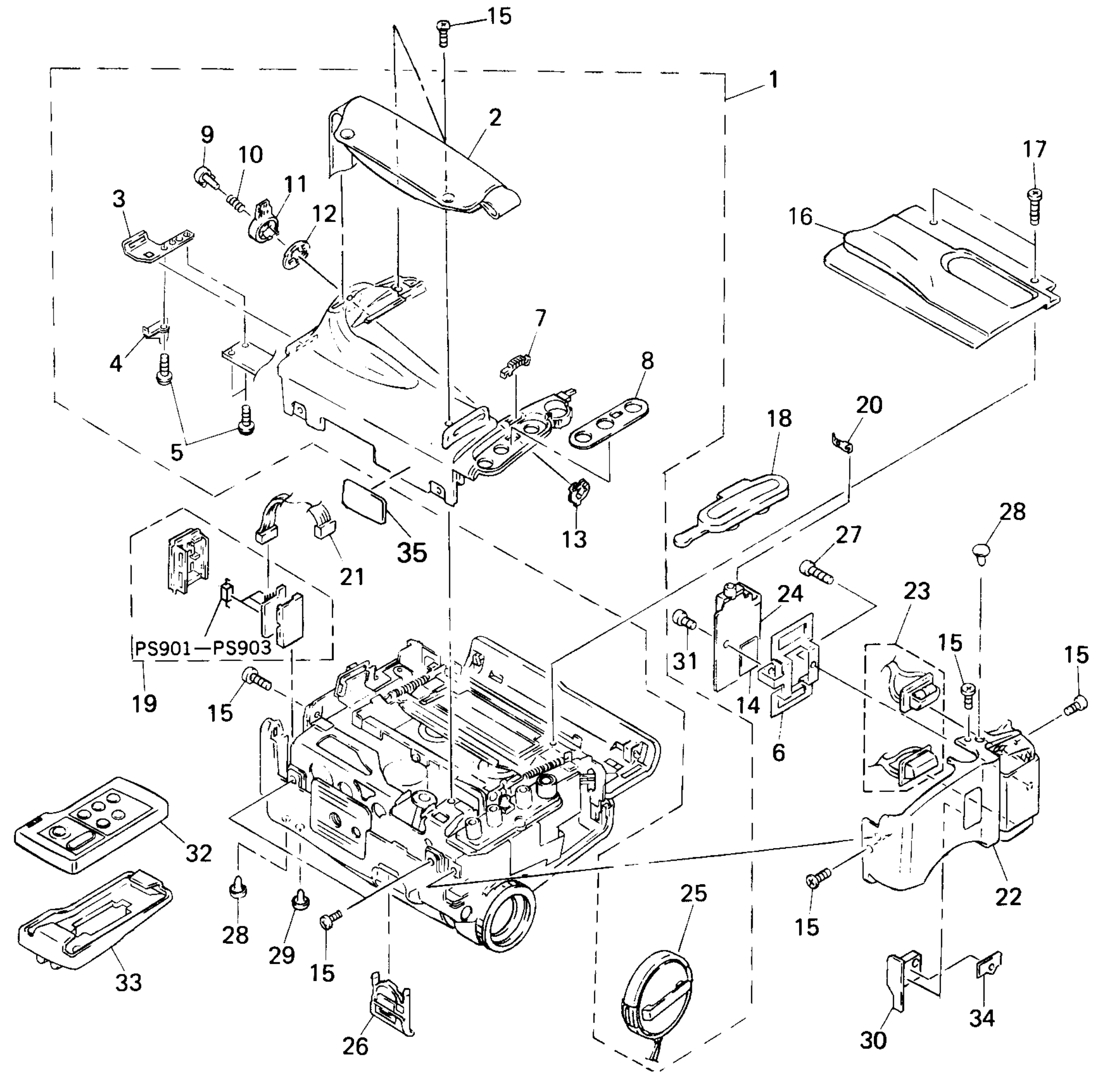
SECTION 5
EXPLODED VIEWS

NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE)...(RED)
  ↑ Parts Color ↑ Cabinet's Color
- Hardware(# mark) list is given in the last of this parts list.

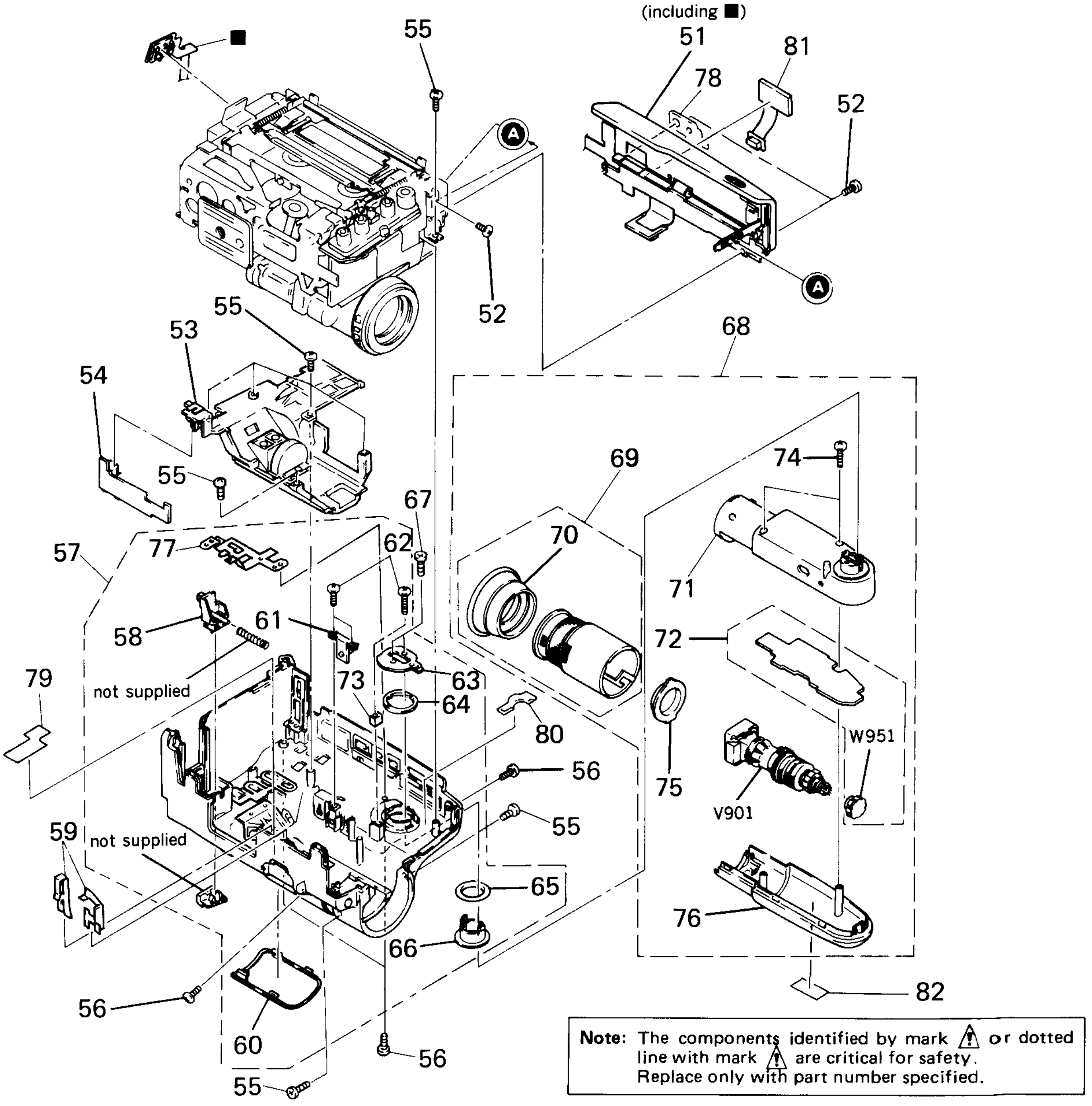
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1. CABINET (L) ASSEMBLY



Ref. No.	Part No.	Description	Remark
1	A-7081-733-A	CABINET (L) BLOCK ASSY (E, AUS)	
1	A-7081-762-A	CABINET (L) BLOCK ASSY (AEP, UK)	
2	3-736-807-01	BELT, GRIP	
3	3-736-338-01	BRACKET, BELT	
4	3-736-360-01	JOINT, LR	
5	3-669-480-11	+ PTPWH 2	
6	* 3-942-954-01	BRACKET, MA	
7	3-749-704-01	LID, IN OUT (AEP, UK)	
7	3-942-944-01	KNOB, IN OUT (E, AUS)	
8	3-747-134-21	COVER, I/O	
9	3-942-950-01	BUTTON, S/S	
10	3-578-221-00	SPRING, COMPRESSION	
11	3-942-985-01	KNOB, STAND-BY	
12	3-736-364-01	SPRING	
13	3-942-953-01	HOLDER, STAND-BY KNOB	
14	* 3-943-853-01	SHEET, MA	
15	3-719-381-01	SCREW (M2X4)	
16	X-3940-992-1	LID ASSY, CASSETTE	
17	3-727-902-11	SCREW (M1.4), SPECIAL	
18	3-942-986-01	COVER, JACK	
19	1-537-297-31	TERMINAL BOARD, BATTERY	
20	* 3-942-941-01	PLATE (F), GROUND	
21	1-944-055-11	HARNESS (CD-26)	
22	X-3940-923-1	PANEL ASSY, F	
23	A-7091-657-A	MICRPOHONE UNIT	
24	A-7062-907-A	MA-116 BOARD, COMPLETE	
25	A-7091-564-A	CAP BLOCK ASSY, LENS	
26	3-942-951-01	LID, BATTERY CASE, LITHIUM	
27	3-719-601-01	SCREW (B2X5), TAPPING	
28	3-728-267-01	COVER, 3.5 JACK	
29	3-728-266-01	COVER, 2.5 JACK	
30	A-7071-473-A	RM-56 BOARD, COMPLETE	
31	3-713-786-51	SCREW (M2X3)	
32	1-465-934-11	REMOTE COMMANDER (CAM CORDER) (RMT-504)	
33	3-943-154-01	HOLDER, REMOTE CONTROL	
34	* 3-943-854-01	PLATE, LIGHT INTERCEPTION	
35	* 3-944-103-01	LABEL, MODEL NUMBER (AEP)	
35	* 3-944-104-01	LABEL, MODEL NUMBER (UK, E, AUS)	
PS901 ⚠·	1-532-841-21	LINK, IC PRF1600 (1.6A)	
PS902 ⚠·	1-532-841-21	LINK, IC PRF1600 (1.6A)	
PS903 ⚠·	1-532-841-21	LINK, IC PRF1600 (1.6A)	

5-2. CABINET (R) ASSEMBLY



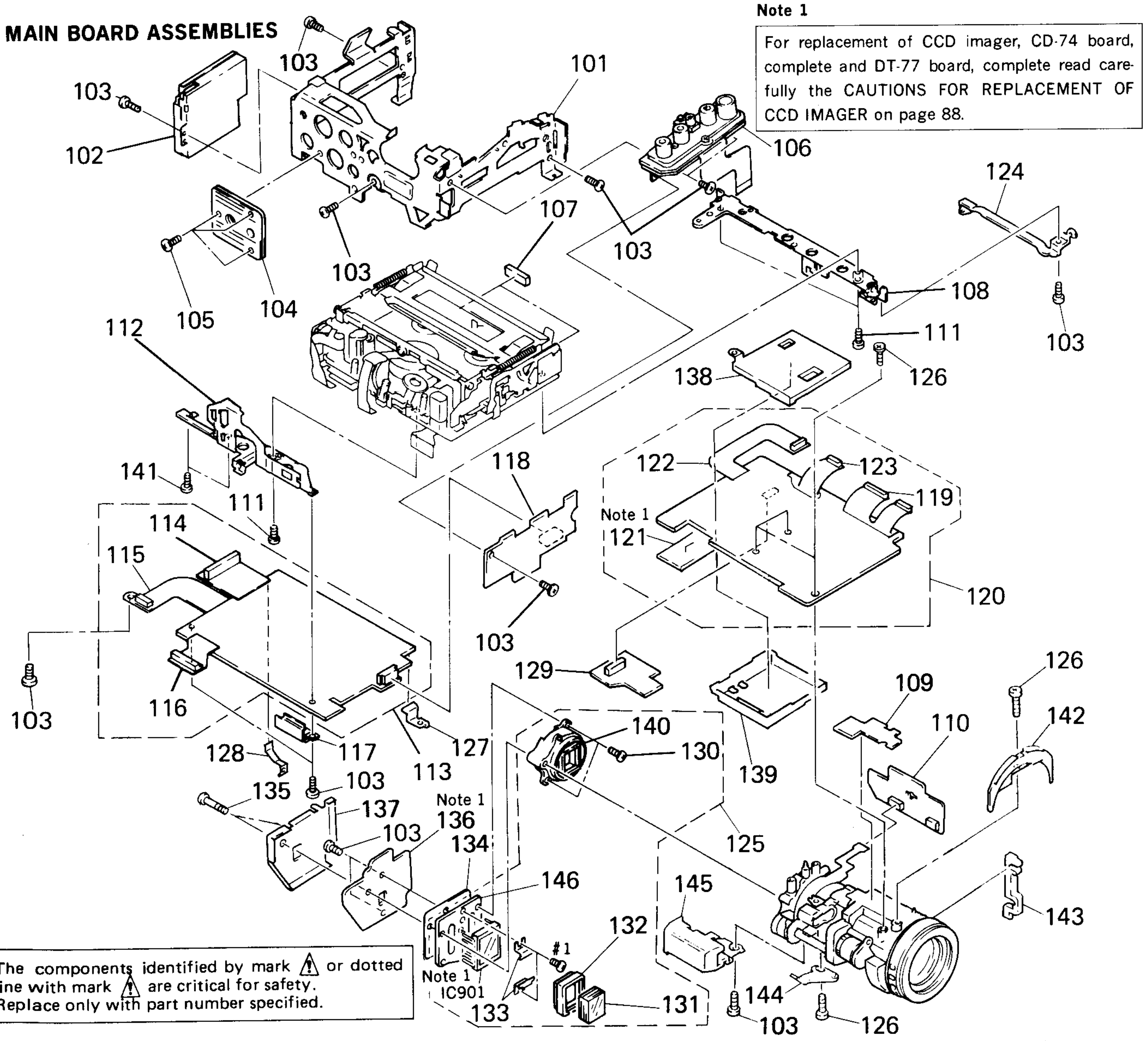
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
51	1-466-559-51	SWITCH BLOCK, CONTROL (FK-3)	(E, AUS)
51	1-466-605-11	SWITCH BLOCK, CONTROL (FK-3)	(AEP, UK)
52	3-713-786-51	SCREW (M2X3)	
53	1-466-560-41	SWITCH BLOCK, CONTROL (CF-3)	
54	A-7071-474-A	HL-4 BOARD, COMPLETE	
55	3-719-408-01	SCREW (B2), TAPPING, P3	
56	3-719-381-01	SCREW (M2X4)	
57	A-7081-760-A	CABINET (R) BLOCK ASSY (AEP, UK)	
57	A-7081-858-A	CABINET (R) BLOCK ASSY (E, AUS)	
58	3-747-164-01	LEVER, RELEASE	
59	1-537-370-11	TERMINAL BOARD, LB	
60	3-942-974-41	LID, SLIDE	
61	X-3747-701-1	PIN ASSY, EVF LOCK	
62	3-719-601-01	SCREW (B2X5), TAPPING	
63	3-747-111-01	PLATE, LOCK, TILT	
64	3-747-110-01	SPRING, LEAF, TILT	
65	3-747-112-01	RING, TILT	
66	3-747-109-01	SLEEVE, EVF	
67	3-740-546-01	SCREW (M2X10)	
68	* A-7019-262-A	EVF COMPLETE ASSY	
69	A-7081-256-A	HOLDER BLOCK ASSY, FINDER	
70	3-736-370-01	EYE CUP	
71	X-3747-704-1	CABINET (L) ASSY, EVF	
72	* A-7062-393-A	VF-40P BOARD, COMPLETE	
73	3-747-178-01	REINFORCEMENT, TILT LOCK	
74	3-713-790-31	SCREW (M2X8), TAPPING, P3	
75	3-747-116-01	COVER, CRT	
76	3-747-745-01	CABINET (R), EVF	
77	3-943-149-01	PLATE, GROUND, LOCK PIN	
78	3-944-112-01	PLATE, GROUND, LCD	
79	3-943-805-01	SHEET (R), ACOUSTIC ABSORBENT	
80	3-943-809-01	CUSHION, EC	
81	1-809-425-21	DISPLAY PANEL, LIQUID CRYSTAL	
82	* 3-704-235-01	LABEL, CAUTION (UK)	
V901	⚠· 1-452-565-11	CRT ASSY	
W951	⚠· 1-540-019-21	SOCKET ASSY, CRT	

5-3. MAIN BOARD ASSEMBLIES

Note 1

For replacement of CCD imager, CD-74 board, complete and DT-77 board, complete read carefully the CAUTIONS FOR REPLACEMENT OF CCD IMAGER on page 88.

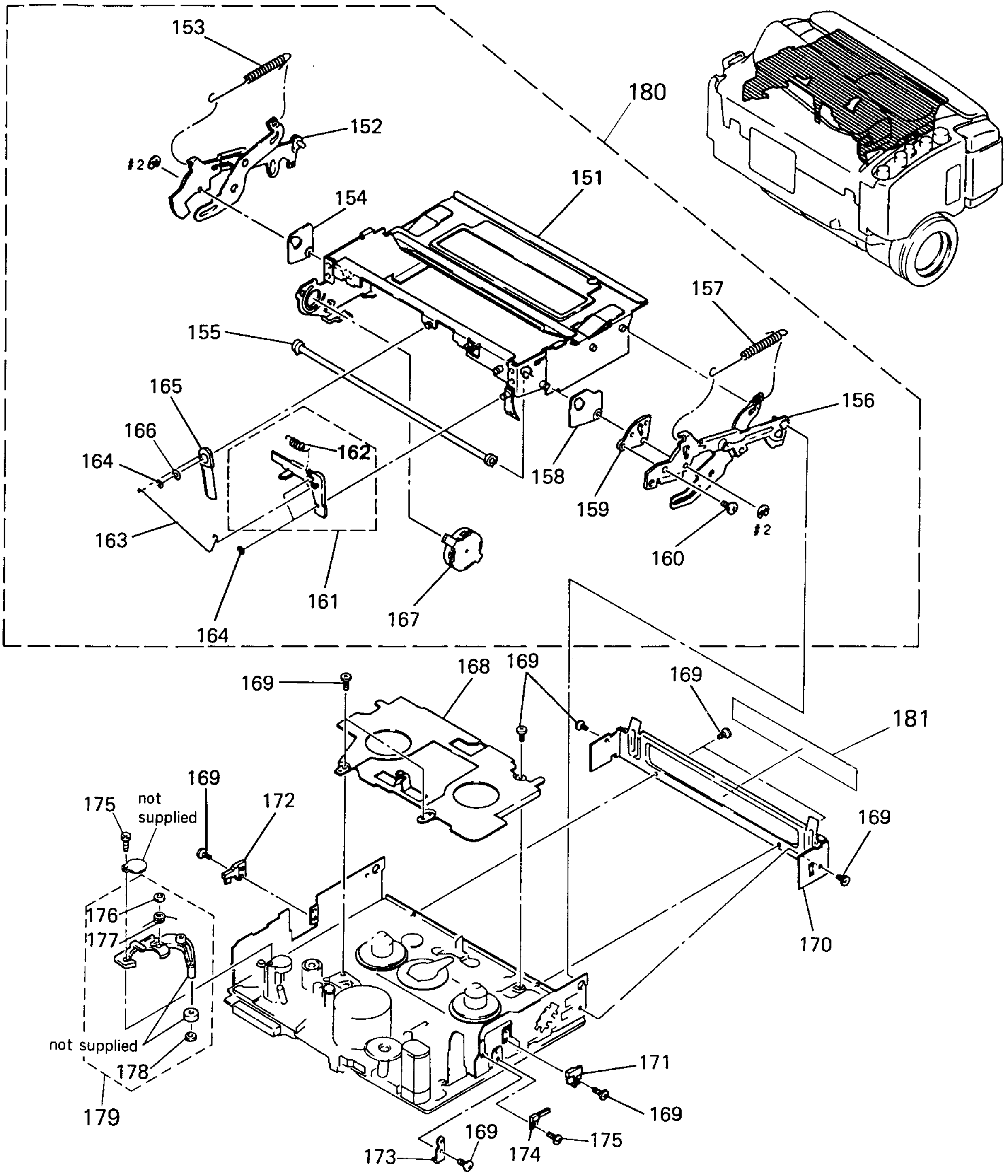


103
103
101
102
106
124
107
103
103
104
105
108
103
111
112
138
126
118
122
123
119
Note 1
121
141
111
114
115
120
103
103
129
126
109
142
116
140
130
110
139
128
117
127
113
135
103
137
Note 1
136
103
134
125
146
145
143
132
#1
Note 1
IC901
133
131
144
103
126

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

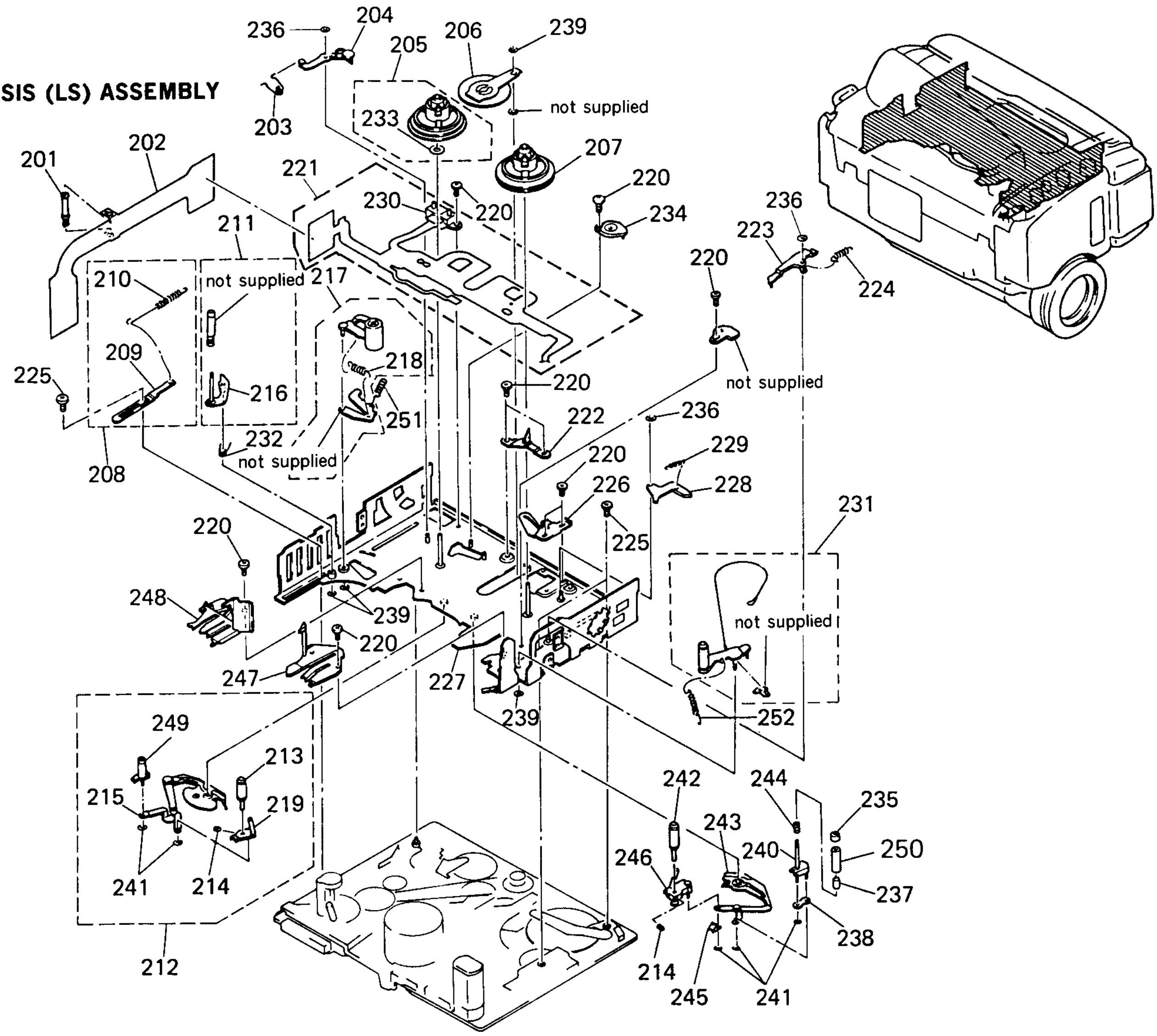
Ref. No.	Part No.	Description	Remark
101	X-3940-684-1	FRAME ASSY, MD	
102	⚠• A-7062-903-A	DD-33P BOARD, COMPLETE	
103	3-713-786-51	SCREW (M2X3)	
104	3-736-396-02	SCREW, TRIPOD	
105	3-719-381-01	SCREW (M2X4)	
106	1-537-373-11	JACK BOARD ASSY	
107	* 3-736-841-02	SPACER, FK	
108	3-942-983-01	FRAME (UPPER)	
109	3-943-806-01	SHEET (VC), ACOUSTIC ABSORBENT	
110	A-7062-902-A	LD-51 BOARD, COMPLETE	
111	3-719-381-31	SCREW (M2X3)	
112	X-3940-683-1	FRAME (LOWER) ASSY	
113	A-7062-901-A	VS-87 BOARD, COMPLETE	
114	1-639-616-11	FP-381 FLEXIBLE BOARD	
115	1-639-617-11	FP-382 FLEXIBLE BOARD	
116	1-630-591-11	FP-182 FLEXIBLE BOARD	
117	* 3-942-936-01	SHIELD, RP CONNECTOR	
118	A-7062-906-A	AU-121 BOARD, COMPLETE	
119	1-639-615-11	FP-379 FLEXIBLE BOARD	
120	A-7062-905-A	VC-106 BOARD, COMPLETE	
121	A-7068-194-A	HIC DT-77 BOARD, COMPLETE(HIC101)Note. 1	
122	1-639-618-11	FP-383 FLEXIBLE BOARD	
123	1-639-623-11	FP-380 FLEXIBLE BOARD	
124	X-3940-856-1	REINFORCEMENT ASSY, VF	
125	* A-7030-270-A	CCD ASSY	
126	3-719-601-01	SCREW (B2X5), TAPPING	
127	* 3-736-324-01	PLATE (LEFT), VS GROUND	
128	* 3-942-939-01	PLATE (R), GROUND, VS	
129	A-7062-904-A	TI-40 BOARD, COMPLETE	
130	3-738-519-11	SCREW (M2X3), +B	
131	1-547-381-12	FILTER BLOCK, OPTICAL (OFB-02-03)	
132	* 3-725-177-01	RUBBER, SEAL	
133	* 3-725-175-01	STOPPER, CCD	
134	* 3-725-180-01	SHEET, INSULATING, CCD HOLDER	
135	3-747-151-01	SCREW (2X16)	
136	A-7071-475-A	CD-74 BOARD, COMPLETE (Note. 1)	
137	* 3-942-952-01	CASE, SHIELD, CD	
138	* 3-942-977-01	CASE (LOWER), SHIELD, VC	
139	* 3-942-976-01	CASE (UPPER), SHIELD, VC	
140	3-725-176-11	HOLDER, CCD	
141	3-704-197-21	SCREW (M1.4X2.5), LOCKING	
142	3-942-981-01	PLATE, BLIND, F PANEL	
143	3-943-807-01	MAFLER, LENS	
144	3-942-940-01	HOLDER, LENS	
145	3-943-569-01	CASE, ACOUSTIC ABSORBENT	
146	3-739-877-11	ADAPTOR, CCD FITTING	
IC901	8-752-606-77	IC ICX039BNA-2 (CCD IMAGER) (Note. 1)	

5-4. CASSETTE COMPARTMENT ASSEMBLY


153
152
#2
154
151
180
157
155
165
166
164
162
156
158
159
160
#2
163
161
167
164
169
168
169
169
181
169
175
not supplied
172
169
176
177
170
not supplied
178
171
169
179
169
173
174
175

Ref. No.	Part No.	Description	Remark
151	X-3940-719-1	CASSETTE COMPARTMENT HOLDER ASSY (4)	
152	X-3940-718-1	ARM (T) ASSY (4), F	
153	3-739-872-01	SPRING, TENSION	
154	3-728-145-01	BEARING (T), MIDWAY GEAR	
155	X-3727-920-1	GEAR ASSY, MIDWAY	
156	X-3940-717-1	ARM (S) ASSY (4), F	
157	3-739-873-01	SPRING, TENSION	
158	3-728-146-01	BEARING (S), MIDWAY GEAR	
159	3-739-808-01	PLATE (2), ADJUSTMENT, C ARM	
160	3-728-126-01	SCREW (M1.4X2), SPECIAL HEAD	
161	A-7040-164-A	ARM BLOCK ASSY, TP	
162	3-509-127-00	SPRING, TENSION	
163	3-728-277-01	BAR, JOINT	
164	3-331-007-11	WASHER	
165	X-3940-991-1	PROTECTOR ASSY (2), T	
166	3-749-304-01	WASHER, STOPPER	
167	X-3739-809-1	DAMPER ASSY (2)	
168	3-728-227-01	BASE, LED	
169	3-728-103-11	SCREW (M1.4X1.6), SPECIAL HEAD	
170	3-943-055-01	FRAME (L), LS	
171	3-727-957-01	HOLDER (S), SENSOR	
172	3-727-954-01	HOLDER (T), SENSOR	
173	3-727-946-01	SUPPORT, LS	
174	1-572-611-11	SWITCH, LEAF	
175	3-728-148-11	SCREW (M1.4X2.5), SPECIAL HEAD	
176	3-943-533-01	WASHER, STOPPER	
177	3-943-439-01	SPRING, TORSION	
178	3-321-393-11	WASHER, STOPPER	
179	A-7040-264-B	ROLLER BLOCK ASSY, HD	
180	A-7040-256-C	CASSETTE COMPARTMENT HOLDER BLOCK ASSY (4)	
181	3-943-701-01	LABEL, CAUTION	

5-5. CHASSIS (LS) ASSEMBLY

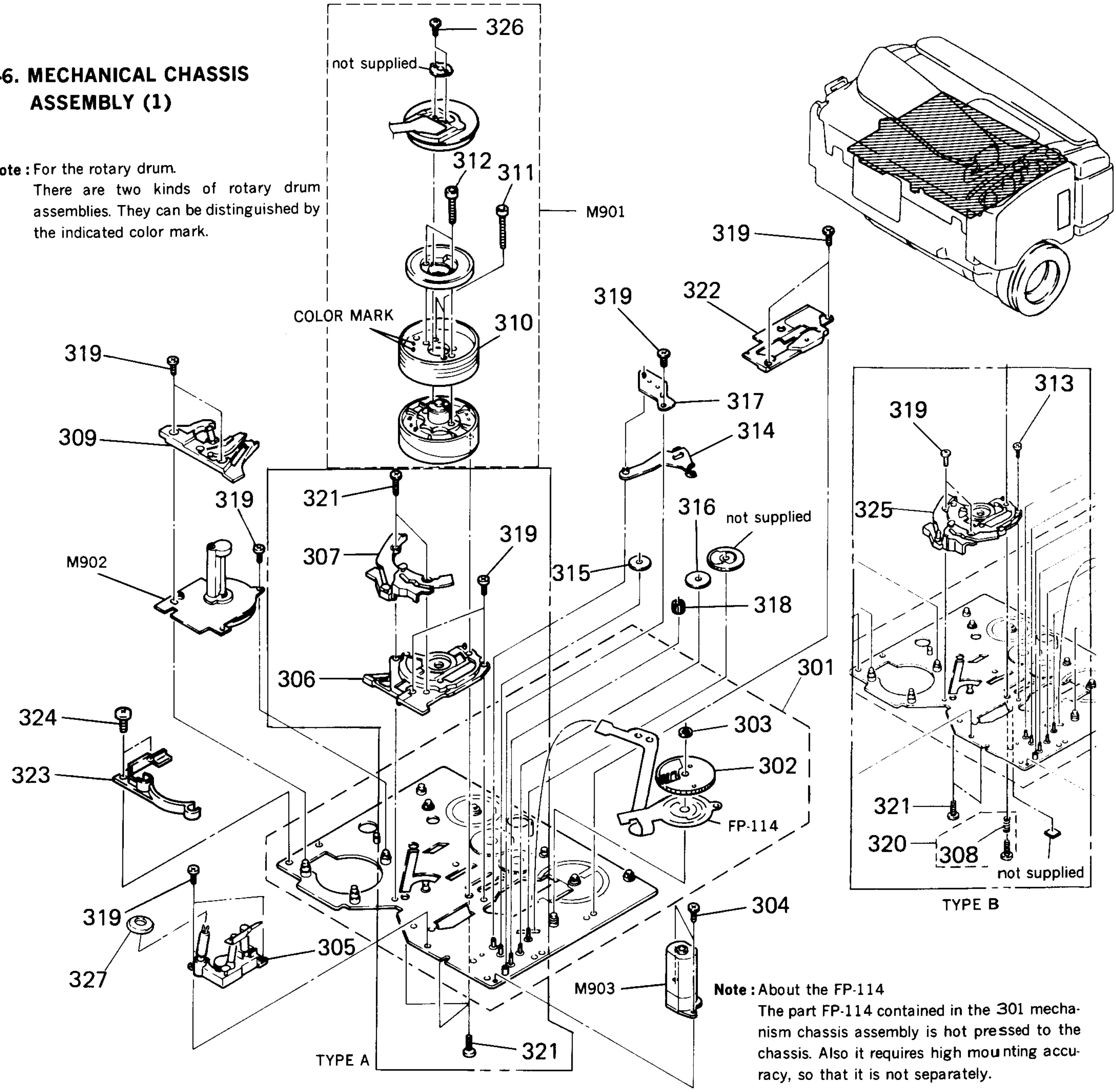


236
204
205
206
239
203
233
not supplied
207
201
202
221
230
220
220
234
211
236
223
220
224
210
not supplied
217
209
218
216
220
225
not supplied
251
236
222
229
232
not supplied
220
228
208
226
231
225
220
248
239
not supplied
220
247
227
239
252
249
213
215
219
242
244
235
243
240
250
246
241
214
237
238
214
245
241
212

Ref. No.	Part No.	Description	Remark
201	3-739-807-01	SHAFT (2), FLEXIBLE ROTARY	
202	1-639-334-11	FP-422 FLEXIBLE BOARD	
203	3-732-068-01	SPRING (JD), RATCHET	
204	X-3728-005-1	RATCHET ASSY (JD), T	
205	X-3727-951-2	TABLE ASSY, REEL, TAKE-UP	
206	X-3727-926-1	ARM ASSY, GEAR	
207	X-3727-952-1	TABLE ASSY, REEL, SUPPLY	
208	A-7040-150-A	SLIDER BLOCK ASSY, CAM	
209	3-728-089-01	SLIDER, CAM	
210	3-727-936-01	SPRING, TENSION	
211	A-7040-151-A	ARM BLOCK ASSY, TG11	
212	A-7040-148-A	ARM (T) BLOCK ASSY, GUIDE	
213	X-3727-994-1	ROLLER ASSY, TG8	
214	3-728-290-01	SCREW (M1.2)	
215	X-3727-940-1	ARM (T) ASSY, GUIDE	
216	X-3727-913-2	ARM ASSY, TG11	
217	A-7040-240-A	ARM BLOCK ASSY (JD), PINCH	
218	3-727-927-01	SPRING (POWER TENSION), TENSION	
219	X-3727-947-1	BASE ASSY, TG7	
220	3-728-103-11	SCREW (M1.4X1.6), SPECIAL HEAD	
221	A-7062-792-A	FP-423 BOARD, COMPLETE	
222	X-3940-087-1	BASE ASSY, RL	
223	3-732-077-01	RATCHET (JD), S	
224	3-732-076-01	SPRING (JD), TENSION	
225	3-941-601-01	SCREW (M1.4X2.5), SPECIAL HEAD	
226	3-728-206-01	PLATE, CAM, LS	
227	X-3940-186-1	CHASSIS ASSY (S), LS	
228	3-732-079-01	ARM (JD), S SOFT	
229	3-732-078-01	SPRING (JD), TENSION	
230	1-572-802-12	SWITCH, PUSH (3 KEY)	
231	X-3749-001-1	ARM ASSY (JD), TG1	
232	3-727-939-01	SPRING (JD), TORSION	
233	3-701-439-11	WASHER	
234	X-3727-914-4	CLUTCH ASSY, ONEWAY	
235	3-943-822-01	FLANGE (P), TG4 UPPER	
236	3-728-091-01	WASHER, STOPPER	
237	3-728-048-01	SLEEVE, TG4	
238	3-728-053-01	PLATE, UNDER, TG4	
239	3-315-414-31	WASHER	
240	X-3727-936-2	BASE ASSY, TG4	
241	3-331-007-11	WASHER	
242	X-3940-733-1	ROLLER ASSY (3), TG5	
243	X-3727-941-1	ARM (S) ASSY, GUIDE	
244	3-728-023-01	SPRING, COMPRESSION	
245	3-728-062-01	SPRING (6GB), LEAF	
246	X-3727-948-1	BASE ASSY, TG6	
247	3-728-226-01	RAIL (S) (JD), GUIDE	
248	3-728-244-01	RAIL (T), GUIDE	
249	X-3728-004-1	ROLLER ASSY (2), TG8	
250	3-945-146-01	ROLLER (LV), TG4	
251	3-732-089-01	SPRING (JD), TENSION	
252	3-940-616-03	SPRING (JD), TENSION	

5-6. MECHANICAL CHASSIS ASSEMBLY (1)

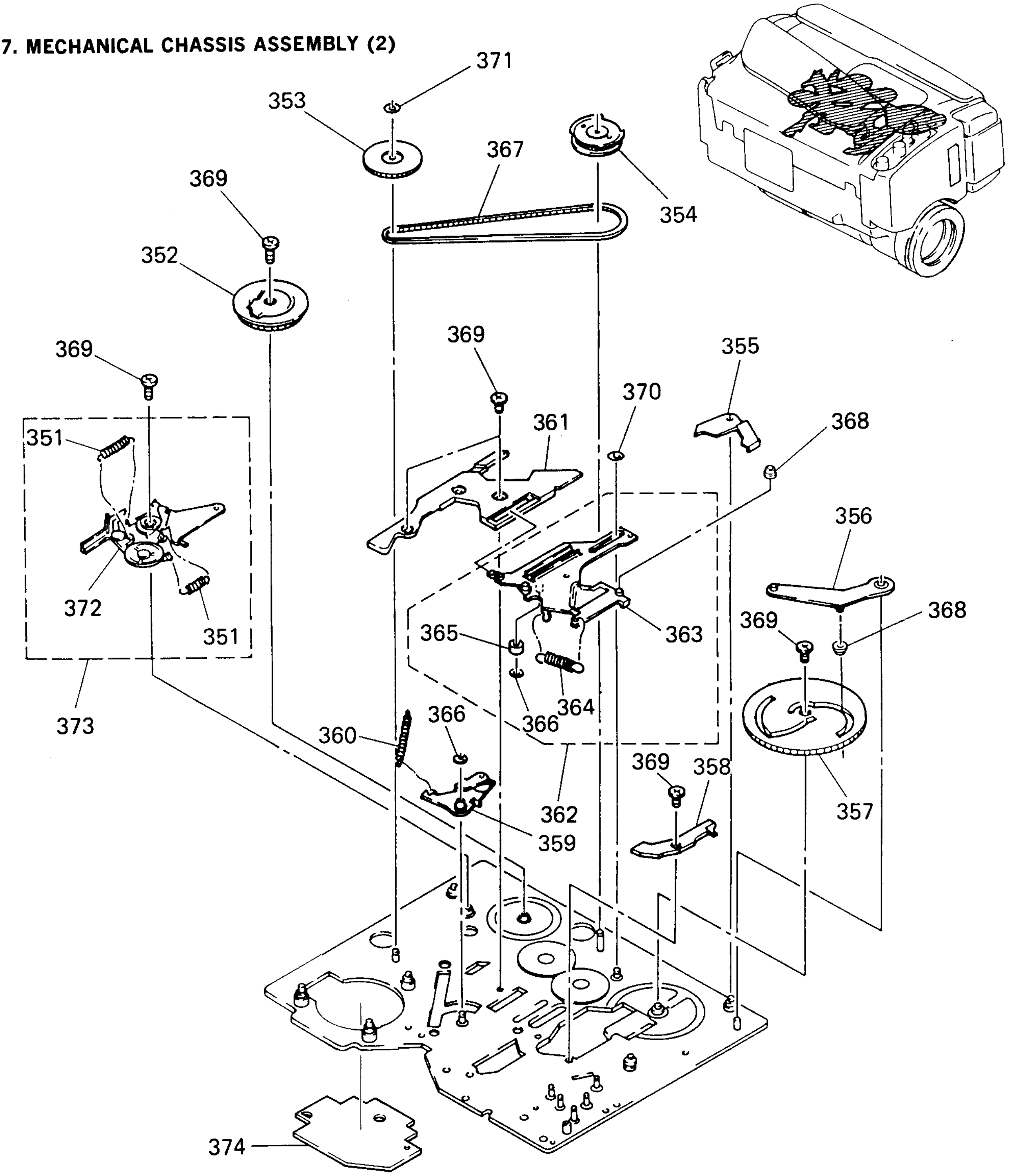
Note : For the rotary drum.
There are two kinds of rotary drum assemblies. They can be distinguished by the indicated color mark.


326
not supplied
312
311
M901
COLOR MARK
310
319
309
319
M902
321
307
319
306
324
323
319
327
305
TYPE A
321
319
322
319
317
314
316
not supplied
315
318
301
303
302
FP-114
304
M903
313
319
325
321
320
308
not supplied
TYPE B

Note : About the FP-114
The part FP-114 contained in the 301 mechanism chassis assembly is hot pressed to the chassis. Also it requires high mounting accuracy, so that it is not separately.

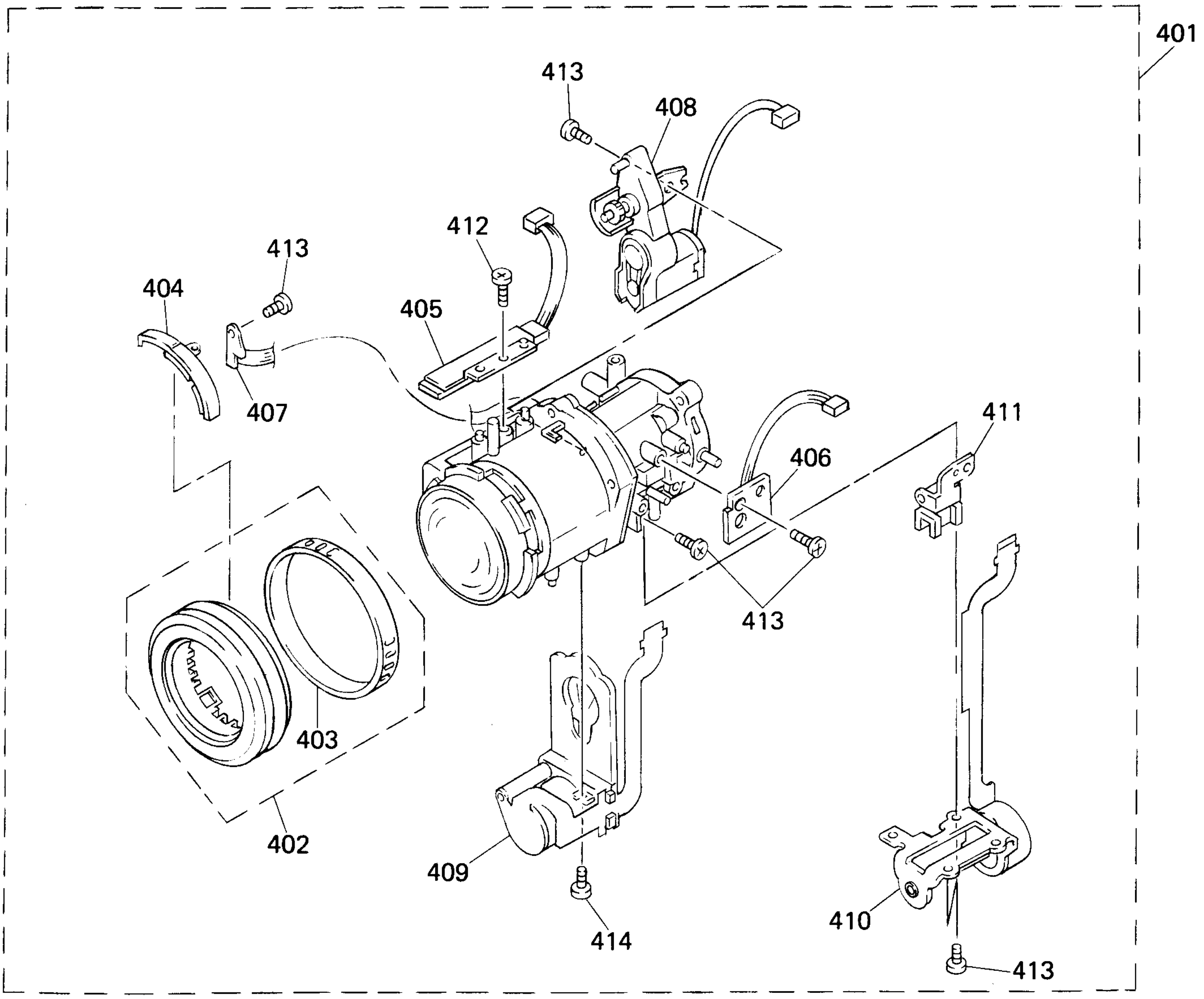
Ref. No.	Part No.	Description	Remark
301	A-7040-154-P	CHASSIS ASSY, MECHANICAL	
302	X-3727-915-1	GEAR ASSY, MODE	
303	3-325-290-21	WASHER, STOPPER	
304	3-732-087-31	SCREW (M1.4X1.8), SPECIAL HEAD	
305	A-7040-251-A	BASE (1) BLOCK ASSY (3), RAIL	
306	X-3727-997-4	BASE (M) ASSY, DRUM (A TYPE)	
307	X-3941-027-1	RAIL (BASE) (3) ASSY (2), GUIDE (A TYPE)	
308	3-743-633-01	SPRING, COMPRESSION (B TYPE)	
309	A-7040-263-A	RAIL(S) BLOCK ASSY(3) (JD), GUIDE	
310	A-7049-461-A	DRUM ASSY, UPPER, ROTARY (DGR-80-R-(1)) MARKING: GREEN/RED, BLACK	
310	A-7049-464-A	DRUM ASSY, UPPER, ROTARY (DGR-80-R-(2)) MARKING: RED, BLUE	
311	3-727-809-01	BOLT (M1.4X5), HEXAGON SOCKET	
312	3-727-807-01	BOLT (M1.7X3.3), HEXAGON SOCKET	
313	3-703-816-51	SCREW (M1.4X3.5), SPECIAL HEAD (B TYPE)	
314	X-3727-906-1	ARM ASSY	
315	X-3727-903-1	GEAR ASSY, NO. 1	
316	X-3727-904-1	GEAR ASSY, NO. 2	
317	3-728-119-01	RETAINER, GEAR	
318	3-728-149-01	GEAR, NO. 0	
319	3-728-148-11	SCREW (M1.4X2.5), SPECIAL HEAD	
320	X-3728-009-2	SCREW ASSY, FITTING (B TYPE)	
321	3-728-108-01	SCREW (M1.4X4.5)	
322	3-728-231-06	BASE, TG-1 CAM	
323	3-732-064-01	COVER, ROTOR	
324	3-728-126-01	SCREW (M1.4X2), SPECIAL HEAD	
325	* A-7040-203-C	BASE (A) BLOCK ASSY, DRUM	
326	3-728-108-41	SCREW (M1.4X2.7)	
327	3-943-088-01	WHEEL, FLY, IP	
M901	A-7048-534-A	DRUM BLOCK ASSY (DGH-80A-R)	
M902	8-835-329-12	MOTOR, DC U-21A (CAPSTAN)	
M903	1-541-607-21	MOTOR, DC (LA12G-344VA) (LOADING)	

5-7. MECHANICAL CHASSIS ASSEMBLY (2)


371
353
367
354
369
352
369
355
370
361
368
351
356
372
363
369
368
351
365
364
373
366
366
360
362
369
358
357
359
374

Ref. No.	Part No.	Description	Remark
351	3-728-065-01	SPRING, TENSION	
352	3-728-190-01	CAM (B)	
353	X-3727-930-1	GEAR ASSY, CONVERSION	
354	X-3727-931-1	PULLEY ASSY, MIDWAY	
355	3-728-154-01	ARM, EJ	
356	3-941-980-01	ARM (T), LS	
357	3-728-208-02	CAM (A)	
358	3-728-213-01	SUPPORT (S), GL	
359	X-3727-924-2	ARM ASSY, GUIDE LOCK	
360	3-728-015-01	SPRING (POWER TENSION), TENSION	
361	3-728-228-03	SUPPORT (T), GL	
362	A-7040-153-A	SLIDER BLOCK ASSY, GL	
363	X-3727-942-1	SLIDER ASSY, GL	
364	3-727-929-01	SPRING (POWER TENSION), TENSION	
365	3-728-144-01	ROLLER, GL	
366	3-331-007-11	WASHER	
367	3-728-212-01	BELT, RELAY	
368	3-728-109-01	ROLLER, LS	
369	3-728-148-11	SCREW (M1.4X2.5), SPECIAL HEAD	
370	3-315-384-31	WASHER, STOPPER	
371	3-728-091-01	WASHER, STOPPER	
372	X-3940-335-1	ARM ASSY, PINCH PRESS	
373	A-7040-152-A	ARM BLOCK ASSY, PINCH PRESS	
374	3-942-901-01	COVER (L), CAPSTAN	

5-8. ZOOM LENS ASSEMBLY


401
413
408
412
413
404
405
407
411
406
413
403
402
409
414
410
413

Ref. No.	Part No.	Description	Remark
401	1-547-494-11	LENS, ZOOM (VCL-7808XA)	
402	3-708-291-01	RING UNIT, F	
403	3-708-292-01	RUBBER, (F) RING	
404	3-708-293-01	COVER, (F) ENCODER	
405	3-708-294-01	ENCODER UNIT, Z	
406	3-708-295-01	SENSOR ASSY, RESET	
407	3-708-296-01	ENCODER ASSY, F	
408	3-708-297-01	MOTOR ASSY, PZ	
409	3-708-298-01	METER ASSY, IG	
410	3-708-299-01	MOTOR ASSY, AF	
411	3-708-300-01	RACK UNIT	
412	3-708-301-01	ENCODER ASSY, Z	
413	3-708-302-01	SCREW, FITTING M.E	
414	3-708-303-01	SCREW, FITTING IG	

SECTION 6
ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- -XX, -X mean standardized parts, so they may have some differences from the original one.
- CAPACITORS
  uF: μF
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F: nonflammable
- COILS
  uH: μH
- SEMICONDUCTORS
  In each case, u: μ, for example:
  uA...: μA..., uPA...: μPA...,
  uPB...: μPB..., uPC...: μPC...,
  uPD...: μPD....

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref. No.	Part No.	Description			Remark
	A-7062-906-A	AU-121 BOARD, COMPLETE			
		************************			
		(Ref. No 6,000 Series)			
		< CAPACITOR >			
C801	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C802	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C803	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C805	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C806	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C807	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C808	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C809	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C810	1-126-607-11	ELECT CHIP	47uF	20%	4V
C811	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C812	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C813	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C814	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C815	1-162-965-11	CERAMIC CHIP	0.0015uF	10%	50V
C816	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C817	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C818	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C819	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C820	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C821	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C822	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C823	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C824	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C825	1-162-977-11	CERAMIC CHIP	0.0018uF	10%	50V
C826	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C827	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C828	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C829	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C830	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C831	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C832	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C833	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C834	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C835	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C836	1-126-209-11	ELECT CHIP	100uF	20%	4V
C837	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C838	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C839	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C840	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C841	1-126-607-11	ELECT CHIP	47uF	20%	4V
C842	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C843	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C844	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C845	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C846	1-162-965-11	CERAMIC CHIP	0.0015uF	10%	50V
C847	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C848	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C849	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C850	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C851	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C852	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C853	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C854	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C855	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C856	1-162-977-11	CERAMIC CHIP	0.0018uF	10%	50V
C857	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C858	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C859	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C860	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C861	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C862	1-128-003-11	ELECT CHIP	22uF	20%	4V
C863	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C864	1-135-091-00	TANTALUM CHIP	1uF	20%	16V

Ref. No.	Part No.	Description			Remark
C865	1-128-003-11	ELECT CHIP	22uF	20%	4V
C866	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C867	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C868	1-126-607-11	ELECT CHIP	47uF	20%	4V
C869	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C870	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C871	1-126-607-11	ELECT CHIP	47uF	20%	4V
C872	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C873	1-128-003-11	ELECT CHIP	22uF	20%	4V
C874	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C875	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C876	1-128-003-11	ELECT CHIP	22uF	20%	4V
C877	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C878	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C879	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C880	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C881	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C882	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C883	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C885	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C886	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C887	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C888	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C889	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C890	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C891	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C892	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C893	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C894	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C895	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C896	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C897	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C898	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C899	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V

< CONNECTOR >

CN801	1-580-249-61	CONNECTOR, BOARD TO BOARD 24P
CN802	1-580-789-21	PIN, CONNECTOR (SMD) 6P
CN803	* 1-566-758-11	PIN, CONNECTOR (PC BOARD) 3P

< FILTER >

FL801	1-236-837-21	FILTER, BAND PASS
FL802	1-236-838-21	FILTER, BAND PASS

< IC >

IC801	8-759-823-19	IC	CXA1488R
IC802	8-759-823-19	IC	CXA1488R
IC803	8-759-823-21	IC	CXA1536Q
IC804	8-759-008-67	IC	MC14066BF

< TRANSISTOR >

Ref. No.	Part No.	Description			Remark
Q801	8-729-905-23	TRANSISTOR	2SA1576-R		
Q802	8-729-905-18	TRANSISTOR	DTC144EU		
Q803	8-729-402-81	TRANSISTOR	XN4501		
Q804	8-729-402-81	TRANSISTOR	XN4501		
Q805	8-729-402-81	TRANSISTOR	XN4501		

< RESISTOR >

R801	1-216-836-11	METAL CHIP	18K	5%	1/16W
R802	1-216-840-11	METAL CHIP	39K	5%	1/16W
R804	1-216-837-11	METAL CHIP	22K	5%	1/16W
R805	1-216-859-11	METAL GLAZE	1.5M	5%	1/16W
R806	1-216-836-11	METAL CHIP	18K	5%	1/16W
R808	1-216-836-11	METAL CHIP	18K	5%	1/16W
R810	1-216-832-11	METAL CHIP	8.2K	5%	1/16W
R811	1-216-839-11	METAL CHIP	33K	5%	1/16W
R812	1-216-833-11	METAL CHIP	10K	5%	1/16W
R813	1-216-810-11	METAL CHIP	120	5%	1/16W
R814	1-216-821-11	METAL CHIP	1K	5%	1/16W
R815	1-216-833-11	METAL CHIP	10K	5%	1/16W
R816	1-216-845-11	METAL CHIP	100K	5%	1/16W
R817	1-216-821-11	METAL CHIP	1K	5%	1/16W
R818	1-216-848-11	METAL CHIP	180K	5%	1/16W
R831	1-216-836-11	METAL CHIP	18K	5%	1/16W
R832	1-216-840-11	METAL CHIP	39K	5%	1/16W
R833	1-216-835-11	METAL CHIP	15K	5%	1/16W
R835	1-216-837-11	METAL CHIP	22K	5%	1/16W
R836	1-216-859-11	METAL GLAZE	1.5M	5%	1/16W
R837	1-216-836-11	METAL CHIP	18K	5%	1/16W
R839	1-216-836-11	METAL CHIP	18K	5%	1/16W
R841	1-216-832-11	METAL CHIP	8.2K	5%	1/16W
R842	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R843	1-216-839-11	METAL CHIP	33K	5%	1/16W
R844	1-216-833-11	METAL CHIP	10K	5%	1/16W
R845	1-216-810-11	METAL CHIP	120	5%	1/16W
R846	1-216-821-11	METAL CHIP	1K	5%	1/16W
R847	1-216-833-11	METAL CHIP	10K	5%	1/16W
R848	1-216-845-11	METAL CHIP	100K	5%	1/16W
R849	1-216-821-11	METAL CHIP	1K	5%	1/16W
R850	1-216-817-11	METAL CHIP	470	5%	1/16W
R852	1-216-801-11	METAL CHIP	22	5%	1/16W
R861	1-216-864-11	METAL CHIP	0	5%	1/16W
R862	1-216-830-11	METAL CHIP	5.6K	5%	1/16W
R863	1-216-864-11	METAL CHIP	0	5%	1/16W
R864	1-216-830-11	METAL CHIP	5.6K	5%	1/16W
R866	1-216-841-11	METAL CHIP	47K	5%	1/16W
R867	1-216-841-11	METAL CHIP	47K	5%	1/16W
R870	1-216-845-11	METAL CHIP	100K	5%	1/16W

AU-121 | BATTERY TERMINAL | CD-74

Ref. No.	Part No.	Description			Remark
R871	1-216-675-11	METAL CHIP	10K	0.5%	1/10W
R872	1-216-667-11	METAL CHIP	4.7K	0.5%	1/10W
R873	1-216-671-11	METAL CHIP	6.8K	0.5%	1/10W
R874	1-216-837-11	METAL CHIP	22K	5%	1/16W
R875	1-216-836-11	METAL CHIP	18K	5%	1/16W
R876	1-216-819-11	METAL CHIP	680	5%	1/16W
R877	1-216-821-11	METAL CHIP	1K	5%	1/16W
R878	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R879	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R880	1-216-845-11	METAL CHIP	100K	5%	1/16W
R881	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R882	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R883	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R884	1-216-837-11	METAL CHIP	22K	5%	1/16W
R885	1-216-836-11	METAL CHIP	18K	5%	1/16W
R886	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R887	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R888	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R889	1-216-837-11	METAL CHIP	22K	5%	1/16W
R890	1-216-836-11	METAL CHIP	18K	5%	1/16W
R891	1-216-821-11	METAL CHIP	1K	5%	1/16W
R892	1-216-821-11	METAL CHIP	1K	5%	1/16W
R893	1-216-817-11	METAL CHIP	470	5%	1/16W
R894	1-216-813-11	METAL CHIP	220	5%	1/16W
R895	1-216-819-11	METAL CHIP	680	5%	1/16W
R896	1-216-821-11	METAL CHIP	1K	5%	1/16W
R897	1-216-821-11	METAL CHIP	1K	5%	1/16W
R898	1-216-821-11	METAL CHIP	1K	5%	1/16W
R899	1-216-821-11	METAL CHIP	1K	5%	1/16W

< VARIABLE RESISTOR >

Ref. No.	Part No.	Description
RV801	1-238-092-11	RES, ADJ, CERMET 47K
RV802	1-238-092-11	RES, ADJ, CERMET 47K
RV803	1-238-092-11	RES, ADJ, CERMET 47K
RV804	1-238-092-11	RES, ADJ, CERMET 47K
RV805	1-238-090-11	RES, ADJ, CERMET 10K
RV806	1-238-090-11	RES, ADJ, CERMET 10K

****

1-537-297-31 BATTERY TERMINAL BOARD

****

< IC LINK >

Ref. No.	Part No.	Description
PS901 ⚠·	1-532-841-21	LINK, IC PRF1600 (1.6A)
PS902 ⚠·	1-532-841-21	LINK, IC PRF1600 (1.6A)
PS903 ⚠·	1-532-841-21	LINK, IC PRF1600 (1.6A)

****

Note 1

For replacement of CCD imager, CD-74 board, complete and DT-77 board, complete read carefully the CAUTIONS FOR REPLACEMENT OF CCD IMAGER on page 88.

Ref. No.	Part No.	Description				Remark
	A-7071-475-A	CD-74 BOARD, COMPLETE (Note. 1)				

****

(Ref. No 2,000 Series)

< CAPACITOR >

Ref. No.	Part No.	Description			
C902	1-135-162-21	TANTALUM CHIP	33uF	20%	6.3V
C905	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C907	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C908	1-135-159-21	TANTALUM CHIP	10uF	10%	20V
C909	1-162-637-11	CERAMIC CHIP	0.47uF		16V
C910	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C911	1-135-079-21	TANTALUM CHIP	3.3uF	10%	35V
C912	1-135-076-21	TANTALUM CHIP	1uF	10%	35V

< CONNECTOR >

Ref. No.	Part No.	Description
CN901	1-580-266-61	CONNECTOR, BOARD TO BOARD 18P

< DIODE >

Ref. No.	Part No.	Description
D901	8-719-820-05	DIODE 1SS181
D902	8-719-404-46	DIODE MA110
D903	8-719-404-46	DIODE MA110
D904	8-719-800-76	DIODE 1SS226

< IC >

Ref. No.	Part No.	Description
IC901	8-752-606-77	IC ICX039BNA-2 (CCD IMAGER) (Note. 1)

< COIL >

Ref. No.	Part No.	Description
L901	1-412-032-11	INDUCTOR CHIP 100uH

< TRANSISTOR >

Ref. No.	Part No.	Description
Q901	8-729-232-86	TRANSISTOR 2SK1875-BL/V-TE85L
Q902	8-729-905-35	TRANSISTOR 2SC4081-R
Q903	8-729-402-19	TRANSISTOR XN6501

< RESISTOR >

Ref. No.	Part No.	Description			Remark
R901	1-216-820-11	METAL CHIP	820	5%	1/16W
R902	1-216-840-11	METAL CHIP	39K	5%	1/16W
R903	1-216-845-11	METAL CHIP	100K	5%	1/16W
R904	1-216-828-11	METAL CHIP	3.9K	5%	1/16W
R905	1-216-809-11	METAL CHIP	100	5%	1/16W
R906	1-216-845-11	METAL CHIP	100K	5%	1/16W
R907	1-216-857-11	METAL CHIP	1M	5%	1/16W
R908	1-216-843-11	METAL CHIP	68K	5%	1/16W
R909	1-216-835-11	METAL CHIP	15K	5%	1/16W
R910	1-216-833-11	METAL CHIP	10K	5%	1/16W
R911	1-216-850-11	METAL CHIP	270K	5%	1/16W
R912	1-216-833-11	METAL CHIP	10K	5%	1/16W
R913	1-216-864-11	METAL CHIP	0	5%	1/16W

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description			Remark
⚠·	A-7062-903-A	DD-33P BOARD, COMPLETE			
		************************			
		(Ref.No 3,000 Series)			
*	3-942-935-01	CASE(LID), SHIELD, DD CONVERTER			
*	3-942-982-01	CASE(MAIN), SHIELD, DD CONVERTER			

< CAPACITOR >

Ref. No.	Part No.	Description			Remark
C101	1-128-078-11	ELECT	33uF	20%	10V
C102	1-163-119-00	CERAMIC CHIP	120PF	5%	50V
C103	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C104	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C105	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C106	1-128-078-11	ELECT	33uF	20%	10V
C201	1-128-078-11	ELECT	33uF	20%	10V
C202	1-163-005-11	CERAMIC CHIP	470PF	10%	50V
C203	1-128-078-11	ELECT	33uF	20%	10V
C204	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C205	1-127-558-11	ELECT(SOLID)	10uF	20%	10V
C206	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C207	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C208	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C209	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C210	1-164-830-11	CERAMIC CHIP	1uF	22%	16V
C211	1-164-337-11	CERAMIC CHIP	2.2uF		16V
C212	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C301	1-124-584-00	ELECT	100uF	20%	10V
C302	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C303	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C304	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C305	1-162-963-11	CERAMIC CHIP	680PF	10%	50V
C306	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C307	1-128-078-11	ELECT	33uF	20%	10V
C308	1-164-830-11	CERAMIC CHIP	1uF	22%	16V
C309	1-127-558-11	ELECT(SOLID)	10uF	20%	10V
C310	1-164-337-11	CERAMIC CHIP	2.2uF		16V
C311	1-164-337-11	CERAMIC CHIP	2.2uF		16V
C312	1-164-830-11	CERAMIC CHIP	1uF	22%	16V
C313	1-164-830-11	CERAMIC CHIP	1uF	22%	16V
C314	1-164-337-11	CERAMIC CHIP	2.2uF		16V
C316	1-164-337-11	CERAMIC CHIP	2.2uF		16V
C317	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C318	1-164-337-11	CERAMIC CHIP	2.2uF		16V
C401	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C402	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C403	1-127-558-11	ELECT(SOLID)	10uF	20%	10V
C404	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C405	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C406	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C501	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C502	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C503	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C504	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C505	1-127-558-11	ELECT(SOLID)	10uF	20%	10V
C506	1-127-558-11	ELECT(SOLID)	10uF	20%	10V
C507	1-163-117-00	CERAMIC CHIP	100PF	5%	50V

< CONNECTOR >

Ref. No.	Part No.	Description
CN101	* 1-566-184-11	PIN, CONNECTOR (PC BOARD) 5P

< DIODE >

Ref. No.	Part No.	Description	
D202	8-719-941-23	DIODE	DA204U
D301	8-719-989-33	DIODE	FC806
D401	8-719-941-04	DIODE	SB007-03CP
D501	8-719-938-75	DIODE	SB05-05CP
D502	8-719-938-75	DIODE	SB05-05CP

< IC >

Ref. No.	Part No.	Description	
IC101	8-759-035-98	IC	MC141600FU
IC102	8-759-035-98	IC	MC141600FU
IC202	8-759-209-57	IC	TC4S69F

< COIL >

Ref. No.	Part No.	Description	
L101	1-424-519-21	COIL, MOLD CHOKE	1.0uH
L102	1-424-519-21	COIL, MOLD CHOKE	1.0uH
L103	1-424-520-21	COIL, MOLD CHOKE	4.7uH
L201	1-424-519-21	COIL, MOLD CHOKE	1.0uH
L202	1-424-520-21	COIL, MOLD CHOKE	4.7uH
L203	1-424-523-21	COIL, CHOKE	22uH
L204	1-424-522-21	COIL, CHOKE	10uH
L205	1-412-030-11	INDUCTOR CHIP	22uH
L206	1-412-030-11	INDUCTOR CHIP	22uH
L301	1-424-519-21	COIL, MOLD CHOKE	1.0uH
L302	1-424-520-21	COIL, MOLD CHOKE	4.7uH
L303	1-424-523-21	COIL, CHOKE	22uH
L304	1-412-034-21	INDUCTOR CHIP	330uH
L305	1-412-032-11	INDUCTOR CHIP	100uH
L306	1-412-028-11	INDUCTOR CHIP	4.7uH
L401	1-424-524-21	COIL, CHOKE	47uH
L402	1-412-030-11	INDUCTOR CHIP	22uH
L403	1-412-030-11	INDUCTOR CHIP	22uH
L501	1-424-524-21	COIL, CHOKE	47uH
L502	1-424-524-21	COIL, CHOKE	47uH

< TRANSISTOR >

Ref. No.	Part No.	Description	
Q101	8-729-823-93	TRANSISTOR	FC150
Q102	8-729-823-95	TRANSISTOR	FC149
Q201	8-729-823-84	TRANSISTOR	FP102

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description				Remark
Q301	8-729-804-41	TRANSISTOR	2SB1122-S			
Q302	8-729-823-84	TRANSISTOR	FP102			
Q303	8-729-901-06	TRANSISTOR	DTA144EK			
Q401	8-729-012-63	TRANSISTOR	2SB1396-S/T/U			
Q501	8-729-805-25	TRANSISTOR	2SB1121			
Q502	8-729-805-25	TRANSISTOR	2SB1121			

< RESISTOR >

Ref. No.	Part No.	Description				Remark
R101	1-216-844-11	METAL CHIP	82K	5%	1/16W	
R102	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R103	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R104	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R105	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R106	1-216-840-11	METAL CHIP	39K	5%	1/16W	
R107	1-216-117-00	METAL CHIP	680K	5%	1/10W	
R201	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R202	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R203	1-216-685-11	METAL CHIP	27K	0.5%	1/10W	
R204	1-216-689-11	METAL CHIP	39K	0.5%	1/10W	
R205	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R206	1-216-838-11	METAL CHIP	27K	5%	1/16W	
R207	1-216-033-00	METAL CHIP	220	5%	1/10W	
R210	1-216-834-11	METAL CHIP	12K	5%	1/16W	
R211	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R301	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R302	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R303	1-216-850-11	METAL CHIP	270K	5%	1/16W	
R305	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R306	1-216-699-11	METAL CHIP	100K	0.5%	1/10W	
R307	1-216-111-00	METAL CHIP	390K	5%	1/10W	
R308	1-216-107-00	METAL CHIP	270K	5%	1/10W	
R309	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R310	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R311	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R312	1-216-685-11	METAL CHIP	27K	0.5%	1/10W	
R313	1-216-689-11	METAL CHIP	39K	0.5%	1/10W	
R314	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R315	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R316	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R317	1-216-033-00	METAL CHIP	220	5%	1/10W	
R318	1-216-033-00	METAL CHIP	220	5%	1/10W	
R319	1-216-005-00	METAL CHIP	15	5%	1/10W	
R320	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R321	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R323	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R324	1-216-679-11	METAL CHIP	15K	0.5%	1/10W	
R325	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R401	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R402	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R403	1-216-685-11	METAL CHIP	27K	0.5%	1/10W	
R404	1-216-689-11	METAL CHIP	39K	0.5%	1/10W	
R405	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R406	1-216-838-11	METAL CHIP	27K	5%	1/16W	
R407	1-216-033-00	METAL CHIP	220	5%	1/10W	
R408	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R501	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R502	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R503	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R504	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R505	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R506	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R507	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R508	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R509	1-216-033-00	METAL CHIP	220	5%	1/10W	
R510	1-216-033-00	METAL CHIP	220	5%	1/10W	
R511	1-216-097-00	METAL CHIP	100K	5%	1/10W	

< VARIABLE RESISTOR >

Ref. No.	Part No.	Description				Remark
RV101	1-238-092-11	RES, ADJ, CERMET 47K				
RV102	1-238-091-11	RES, ADJ, CERMET 22K				

< TRANSFORMER >

Ref. No.	Part No.	Description				Remark
T301	1-450-524-11	TRANSFORMER, CONVERTER				

****

A-7062-792-A FP-423 BOARD, COMPLETE
****
(Ref.No 8,000 Series)

Ref. No.	Part No.	Description				Remark
	3-727-954-01	HOLDER (T), SENSOR				
	3-727-957-01	HOLDER (S), SENSOR				
	3-732-046-01	HOLDER, LED				

< DIODE >

Ref. No.	Part No.	Description				Remark
D991	8-719-951-03	DIODE	GL-453			

< HALL ELEMENT >

Ref. No.	Part No.	Description				Remark
H991	1-808-448-11	ELEMENT, HALL (CHIP TYPE)				
H992	1-808-448-11	ELEMENT, HALL (CHIP TYPE)				

< TRANSISTOR >

Ref. No.	Part No.	Description				Remark
Q991	8-729-907-25	TRANSISTOR	PT4850F			
Q992	8-729-907-25	TRANSISTOR	PT4850F			

< RESISTOR >

Ref. No.	Part No.	Description				Remark
R991	1-216-817-11	METAL CHIP	470	5%	1/16W	

Ref. No.	Part No.	Description			Remark
R992	1-216-817-11	METAL CHIP	470	5%	1/16W
R993	1-216-817-11	METAL CHIP	470	5%	1/16W
R994	1-216-817-11	METAL CHIP	470	5%	1/16W

< SWITCH >

S991	1-572-611-11	SWITCH, LEAF (CLOCK)			
S992	1-572-802-12	SWITCH, PUSH (3 KEY) (TAPE SELECT)			

****

A-7071-474-A HL-4 BOARD, COMPLETE

****

(Ref. No 6,000 Series)

< CAPACITOR >

C501	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C503	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C505	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C506	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V

< CONNECTOR >

CN501	1-566-760-11	PIN, CONNECTOR (PC BOARD) 5P			
CN502	* 1-565-541-11	PIN, CONNECTOR (PC BOARD) 2P			
CN503	* 1-566-762-11	PIN, CONNECTOR (PC BOARD) 7P			

< DIODE >

D501	8-719-420-14	DIODE	MA8082-M		
D502	8-719-106-71	DIODE	RD12M-B2		
D503	8-719-420-14	DIODE	MA8082-M		
D504	8-719-420-14	DIODE	MA8082-M		
D505	8-719-420-14	DIODE	MA8082-M		
D506	8-719-420-14	DIODE	MA8082-M		
D507	8-719-941-86	DIODE	DAN202U		

< JACK >

J501	1-565-276-21	JACK, ULTRA SMALL 1P (REMOTE)			
J502	1-569-809-11	JACK (SMALL TYPE) (PHONES)			

< RESISTOR >

R501	1-216-296-00	METAL CHIP	0	5%	1/8W
R502	1-216-296-00	METAL CHIP	0	5%	1/8W
R503	1-216-296-00	METAL CHIP	0	5%	1/8W
R504	1-216-296-00	METAL CHIP	0	5%	1/8W
R505	1-216-296-00	METAL CHIP	0	5%	1/8W
R506	1-216-296-00	METAL CHIP	0	5%	1/8W

****

A-7062-902-A LD-51 BOARD, COMPLETE

****

(Ref. No 2,000 Series)

< CAPACITOR >

Ref. No.	Part No.	Description			Remark
C851	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C852	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C853	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C854	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C855	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C856	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C857	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C858	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C860	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C861	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C862	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C863	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C864	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C865	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C866	1-164-315-11	CERAMIC CHIP	470PF	10%	50V
C868	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C885	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C886	1-162-638-11	CERAMIC CHIP	1uF		16V
C891	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C894	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C895	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C896	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C897	1-162-974-11	CERAMIC CHIP	0.01uF		50V

< CONNECTOR >

CN851	* 1-565-875-11	PIN, CONNECTOR (PC BOARD) 3P			
CN852	1-573-563-61	CONNECTOR, BOARD TO BOARD 32P			
CN853	1-565-874-11	PIN, CONNECTOR (PC BOARD) 2P			
CN854	1-566-540-11	CONNECTOR, FPC (NON ZIF) 8P			
CN855	* 1-565-875-11	PIN, CONNECTOR (PC BOARD) 3P			
CN856	1-566-537-11	CONNECTOR, FPC (NON ZIF) 5P			
CN857	1-580-057-11	PIN, CONNECTOR 4P			

< IC >

IC851	8-759-998-96	IC	LM324D		
IC852	8-759-998-96	IC	LM324D		
IC853	8-759-513-26	IC	XRU5846FS		
IC854	8-759-981-82	IC	RC3414M		
IC881	8-759-823-51	IC	LB1830M		
IC891	8-759-038-81	IC	MPC1724M		

< COIL >

L891	1-410-381-11	INDUCTOR CHIP 10uH			

Ref. No.	Part No.	Description			Remark
		< TRANSISTOR >			
Q851	8-729-905-35	TRANSISTOR	2SC4081-R		
Q852	8-729-403-35	TRANSISTOR	UN5113		
Q885	8-729-925-42	TRANSISTOR	IMT2		
Q891	8-729-905-61	TRANSISTOR	DTC124EU		
		< RESISTOR >			
R851	1-216-833-11	METAL CHIP	10K	5%	1/16W
R852	1-216-833-11	METAL CHIP	10K	5%	1/16W
R853	1-216-835-11	METAL CHIP	15K	5%	1/16W
R854	1-216-835-11	METAL CHIP	15K	5%	1/16W
R855	1-216-821-11	METAL CHIP	1K	5%	1/16W
R856	1-216-848-11	METAL CHIP	180K	5%	1/16W
R857	1-216-833-11	METAL CHIP	10K	5%	1/16W
R858	1-216-855-11	METAL CHIP	680K	5%	1/16W
R859	1-216-851-11	METAL CHIP	330K	5%	1/16W
R860	1-216-848-11	METAL CHIP	180K	5%	1/16W
R861	1-216-841-11	METAL CHIP	47K	5%	1/16W
R862	1-216-824-11	METAL CHIP	1.8K	5%	1/16W
R863	1-216-833-11	METAL CHIP	10K	5%	1/16W
R864	1-216-857-11	METAL CHIP	1M	5%	1/16W
R865	1-216-820-11	METAL CHIP	820	5%	1/16W
R866	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R867	1-216-837-11	METAL CHIP	22K	5%	1/16W
R868	1-216-844-11	METAL CHIP	82K	5%	1/16W
R869	1-216-843-11	METAL CHIP	68K	5%	1/16W
R870	1-216-841-11	METAL CHIP	47K	5%	1/16W
R871	1-216-839-11	METAL CHIP	33K	5%	1/16W
R872	1-216-833-11	METAL CHIP	10K	5%	1/16W
R873	1-216-833-11	METAL CHIP	10K	5%	1/16W
R874	1-216-857-11	METAL CHIP	1M	5%	1/16W
R875	1-216-819-11	METAL CHIP	680	5%	1/16W
R876	1-216-837-11	METAL CHIP	22K	5%	1/16W
R877	1-216-839-11	METAL CHIP	33K	5%	1/16W
R878	1-216-839-11	METAL CHIP	33K	5%	1/16W
R879	1-216-841-11	METAL CHIP	47K	5%	1/16W
R880	1-216-841-11	METAL CHIP	47K	5%	1/16W
R881	1-216-031-00	METAL CHIP	180	5%	1/10W
R883	1-216-839-11	METAL CHIP	33K	5%	1/16W
R884	1-216-839-11	METAL CHIP	33K	5%	1/16W
R885	1-216-134-00	METAL CHIP	2.2	5%	1/8W
R886	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R887	1-216-845-11	METAL CHIP	100K	5%	1/16W
R888	1-216-845-11	METAL CHIP	100K	5%	1/16W
R891	1-216-842-11	METAL CHIP	56K	5%	1/16W
R892	1-216-816-11	METAL CHIP	390	5%	1/16W

****

A-7062-907-A MA-116 BOARD, COMPLETE

****

(Ref. No 6,000 Series)

Ref. No.	Part No.	Description			Remark
		< CAPACITOR >			
C901	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C902	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C903	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C904	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C905	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C906	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C907	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C908	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C909	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C910	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C911	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C912	1-164-245-11	CERAMIC CHIP	0.015uF	10%	25V
C913	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C914	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C915	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C916	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C917	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C918	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C951	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C952	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C953	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C954	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C955	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C956	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C957	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C958	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C959	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C960	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C961	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C962	1-164-245-11	CERAMIC CHIP	0.015uF	10%	25V
C963	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C964	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C965	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C966	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C967	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C968	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C991	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C992	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C993	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C994	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C995	1-162-957-11	CERAMIC CHIP	220PF	5%	50V

Ref. No.	Part No.	Description	Remark
		< CONNECTOR >	
CN901	* 1-566-759-11	PIN, CONNECTOR (PC BOARD) 4P	
CN902	* 1-566-759-11	PIN, CONNECTOR (PC BOARD) 4P	
CN903	* 1-566-761-11	PIN, CONNECTOR (PC BOARD) 6P	
		< DIODE >	
D901	8-719-404-46	DIODE MA110	
		< IC >	
IC901	8-759-823-41	IC LA7470M	
		< JACK >	
J901	1-569-810-11	JACK (SMALL TYPE) (MIC)	
		< TRANSISTOR >	
Q901	8-729-822-97	TRANSISTOR 2SC4211-5, 6, 7	
Q902	8-729-823-00	TRANSISTOR 2SA1622-5, 6, 7	
Q903	8-729-822-97	TRANSISTOR 2SC4211-5, 6, 7	
Q904	8-729-823-00	TRANSISTOR 2SA1622-5, 6, 7	
Q905	8-729-822-48	TRANSISTOR FC101	
Q906	8-729-822-48	TRANSISTOR FC101	
		< RESISTOR >	
R901	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R902	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R903	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R904	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R905	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R906	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R907	1-216-850-11	METAL CHIP 270K 5% 1/16W	
R908	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R909	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R910	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R911	1-216-832-11	METAL CHIP 8.2K 5% 1/16W	
R912	1-216-830-11	METAL CHIP 5.6K 5% 1/16W	
R913	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R914	1-216-818-11	METAL CHIP 560 5% 1/16W	
R915	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R916	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R917	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R918	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R919	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R920	1-216-864-11	METAL CHIP 0 5% 1/16W	
R951	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R952	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R953	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R954	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R955	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R956	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R957	1-216-850-11	METAL CHIP 270K 5% 1/16W	
R958	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R959	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R960	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R961	1-216-832-11	METAL CHIP 8.2K 5% 1/16W	
R962	1-216-830-11	METAL CHIP 5.6K 5% 1/16W	
R963	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R964	1-216-818-11	METAL CHIP 560 5% 1/16W	
R965	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R966	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R967	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R968	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R969	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R970	1-216-864-11	METAL CHIP 0 5% 1/16W	
R990	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R991	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R992	1-216-295-00	METAL CHIP 0 5% 1/10W	
R993	1-216-295-00	METAL CHIP 0 5% 1/10W	
R994	1-216-295-00	METAL CHIP 0 5% 1/10W	
		< SWITCH >	
S901	1-572-391-11	SWITCH, SLIDE (WIND BUILT IN MIC)	

****

A-7071-473-A RM-56 BOARD, COMPLETE

****

(Ref. No 6,000 Series)

Ref. No.	Part No.	Description	Remark
		< CAPACITOR >	
C401	1-135-217-21	TANTALUM CHIP 15uF 20% 6.3V	
		< CONNECTOR >	
CN401	* 1-566-758-11	PIN, CONNECTOR (PC BOARD) 3P	
		< IC >	
IC401	8-741-100-64	IC SBX1621-51	
		< RESISTOR >	
R401	1-216-017-00	METAL CHIP 47 5% 1/10W	

****

TI-40

Ref. No.	Part No.	Description			Remark
	A-7062-904-A	TI-40 BOARD, COMPLETE			
		**********************			
		(Ref. No 3, 000 Series)			

< CAPACITOR >

Ref. No.	Part No.	Description			Remark
C801	1-164-360-11	CERAMIC CHIP	0. 1uF		16V
C802	1-135-157-21	TANTALUM CHIP	10uF	20%	6. 3V
C803	1-162-637-11	CERAMIC CHIP	0. 47uF		16V
C804	1-162-913-11	CERAMIC CHIP	8PF	0. 5PF	50V
C805	1-162-970-11	CERAMIC CHIP	0. 01uF	10%	25V
C807	1-162-970-11	CERAMIC CHIP	0. 01uF	10%	25V
C808	1-162-964-11	CERAMIC CHIP	0. 001uF	10%	50V
C810	1-135-157-21	TANTALUM CHIP	10uF	20%	6. 3V
C811	1-164-360-11	CERAMIC CHIP	0. 1uF		16V
C812	1-162-970-11	CERAMIC CHIP	0. 01uF	10%	25V
C813	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C814	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C815	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C816	1-164-222-11	CERAMIC CHIP	0. 22uF		25V
C817	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C818	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C819	1-162-970-11	CERAMIC CHIP	0. 01uF	10%	25V

< CONNECTOR >

Ref. No.	Part No.	Description
CN801	1-580-088-11	CONNECTOR, BOARD TO BOARD 22P

< TRIMMER >

Ref. No.	Part No.	Description
CT801	1-141-424-11	CAP, ADJ
CT802	1-141-424-11	CAP, ADJ

< DIODE >

Ref. No.	Part No.	Description	
D801	8-713-300-88	DIODE	1T33C

< IC >

Ref. No.	Part No.	Description	
IC801	8-759-507-53	IC	MS6264CLL
IC802	8-759-518-62	IC	MB-90071-104-PF
IC803	8-759-053-02	IC	MB87818
IC804	8-759-234-20	IC	TC7S08F

< COIL >

Ref. No.	Part No.	Description	
L801	1-410-377-31	INDUCTOR CHIP	4. 7uH
L802	1-410-384-31	INDUCTOR CHIP	18uH
L803	1-410-387-11	INDUCTOR CHIP	33uH
L804	1-410-381-11	INDUCTOR CHIP	10uH
L805	1-410-381-11	INDUCTOR CHIP	10uH

< TRANSISTOR >

Ref. No.	Part No.	Description	
Q801	8-729-905-18	TRANSISTOR	DTC144EU
Q802	8-729-403-24	TRANSISTOR	XN4210
Q803	8-729-905-18	TRANSISTOR	DTC144EU

< RESISTOR >

Ref. No.	Part No.	Description			Remark
R801	1-216-833-11	METAL CHIP	10K	5%	1/16W
R805	1-216-833-11	METAL CHIP	10K	5%	1/16W
R806	1-216-833-11	METAL CHIP	10K	5%	1/16W
R809	1-216-833-11	METAL CHIP	10K	5%	1/16W
R810	1-216-833-11	METAL CHIP	10K	5%	1/16W
R811	1-216-833-11	METAL CHIP	10K	5%	1/16W
R812	1-216-833-11	METAL CHIP	10K	5%	1/16W
R815	1-216-833-11	METAL CHIP	10K	5%	1/16W
R816	1-216-833-11	METAL CHIP	10K	5%	1/16W
R818	1-216-837-11	METAL CHIP	22K	5%	1/16W
R819	1-216-829-11	METAL CHIP	4. 7K	5%	1/16W
R820	1-216-845-11	METAL CHIP	100K	5%	1/16W
R821	1-216-845-11	METAL CHIP	100K	5%	1/16W
R822	1-216-833-11	METAL CHIP	10K	5%	1/16W
R823	1-216-822-11	METAL CHIP	1. 2K	5%	1/16W
R824	1-216-845-11	METAL CHIP	100K	5%	1/16W
R825	1-216-817-11	METAL CHIP	470	5%	1/16W
R826	1-216-825-11	METAL CHIP	2. 2K	5%	1/16W
R827	1-216-825-11	METAL CHIP	2. 2K	5%	1/16W
R828	1-216-825-11	METAL CHIP	2. 2K	5%	1/16W
R829	1-216-825-11	METAL CHIP	2. 2K	5%	1/16W
R830	1-216-817-11	METAL CHIP	470	5%	1/16W
R831	1-216-817-11	METAL CHIP	470	5%	1/16W
R832	1-216-817-11	METAL CHIP	470	5%	1/16W
R834	1-216-829-11	METAL CHIP	4. 7K	5%	1/16W
R835	1-216-825-11	METAL CHIP	2. 2K	5%	1/16W
R836	1-216-825-11	METAL CHIP	2. 2K	5%	1/16W
R839	1-216-825-11	METAL CHIP	2. 2K	5%	1/16W

< NETWORK RESISTOR >

Ref. No.	Part No.	Description
RB801	1-236-424-11	NETWORK, RES 10K
RB802	1-236-424-11	NETWORK, RES 10K
RB804	1-236-424-11	NETWORK, RES 10K
RB805	1-236-424-11	NETWORK, RES 10K
RB806	1-236-416-11	NETWORK, RES 2. 2K

****

Ref. No.	Part No.	Description			Remark
	A-7062-905-A	VC-106 BOARD, COMPLETE			
		**********************			
			(Ref.No 1,000 Series)		
	3-946-052-01	COVER, FILTER			
	8-729-807-87	TRANSISTOR 2SB1295-UL6			
		< CAPACITOR >			
C101	1-135-211-11	TANTAL. CHIP	6.8uF	20%	6.3V
C102	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C103	1-135-162-21	TANTALUM CHIP	33uF	20%	6.3V
C104	1-162-638-11	CERAMIC CHIP	1uF		16V
C105	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C106	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C107	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C108	1-135-163-21	TANTAL. CHIP	47uF	20%	4V
C109	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C110	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C111	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C112	1-162-909-11	CERAMIC CHIP	4PF	0.25PF	50V
C113	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C151	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C152	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C153	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C154	1-135-148-21	TANTAL. CHIP	1.5uF	20%	10V
C155	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C156	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C159	1-162-638-11	CERAMIC CHIP	1uF		16V
C201	1-162-945-11	CERAMIC CHIP	22PF	5%	50V
C202	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C203	1-162-942-11	CERAMIC CHIP	12PF	5%	50V
C204	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C205	1-164-634-11	CERAMIC CHIP	1uF		16V
C206	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C207	1-164-634-11	CERAMIC CHIP	1uF		16V
C208	1-164-634-11	CERAMIC CHIP	1uF		16V
C209	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C210	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C211	1-164-634-11	CERAMIC CHIP	1uF		16V
C212	1-164-634-11	CERAMIC CHIP	1uF		16V
C213	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C214	1-135-217-21	TANTALUM CHIP	15uF	20%	6.3V
C215	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C216	1-135-211-11	TANTAL. CHIP	6.8uF	20%	6.3V
C217	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C218	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C219	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C220	1-135-211-11	TANTAL. CHIP	6.8uF	20%	6.3V
C221	1-164-360-11	CERAMIC CHIP	0.1uF		16V

Ref. No.	Part No.	Description			Remark
C222	1-164-634-11	CERAMIC CHIP	1uF		16V
C223	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C224	1-164-634-11	CERAMIC CHIP	1uF		16V
C225	1-162-638-11	CERAMIC CHIP	1uF		16V
C226	1-162-638-11	CERAMIC CHIP	1uF		16V
C227	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C228	1-164-634-11	CERAMIC CHIP	1uF		16V
C229	1-164-634-11	CERAMIC CHIP	1uF		16V
C230	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C231	1-164-634-11	CERAMIC CHIP	1uF		16V
C232	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C233	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C234	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C235	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C236	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C237	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C238	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C239	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C240	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C241	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C242	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C243	1-135-217-21	TANTALUM CHIP	15uF	20%	6.3V
C251	1-164-634-11	CERAMIC CHIP	1uF		16V
C255	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C256	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C257	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C258	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C259	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C260	1-164-634-11	CERAMIC CHIP	1uF		16V
C261	1-164-634-11	CERAMIC CHIP	1uF		16V
C262	1-162-941-11	CERAMIC CHIP	10PF	0.5PF	50V
C263	1-164-634-11	CERAMIC CHIP	1uF		16V
C264	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C265	1-164-634-11	CERAMIC CHIP	1uF		16V
C266	1-164-634-11	CERAMIC CHIP	1uF		16V
C267	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C268	1-164-634-11	CERAMIC CHIP	1uF		16V
C269	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C270	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C271	1-164-634-11	CERAMIC CHIP	1uF		16V
C272	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C273	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C274	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C275	1-135-162-21	TANTALUM CHIP	33uF	20%	6.3V
C276	1-162-943-11	CERAMIC CHIP	15PF	5%	50V
C277	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C278	1-164-634-11	CERAMIC CHIP	1uF		16V
C280	1-164-634-11	CERAMIC CHIP	1uF		16V
C281	1-164-634-11	CERAMIC CHIP	1uF		16V

VC-106

Ref. No.	Part No.	Description		Remark	
C282	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C283	1-164-634-11	CERAMIC CHIP	1uF		16V
C284	1-164-634-11	CERAMIC CHIP	1uF		16V
C285	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C286	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C287	1-164-634-11	CERAMIC CHIP	1uF		16V
C288	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C289	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C290	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C291	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C292	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C293	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C294	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C295	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C296	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C297	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C298	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C299	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C300	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C301	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C302	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C303	1-135-072-21	TANTALUM CHIP	0.22uF	10%	35V
C304	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C305	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C306	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C307	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C308	1-164-634-11	CERAMIC CHIP	1uF		16V
C309	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C310	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C351	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C353	1-135-215-21	TANTAL. CHIP	6.8uF	20%	16V
C354	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C355	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C356	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C357	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C358	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C359	1-163-118-00	CERAMIC CHIP	110PF	5%	50V
C360	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C361	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C362	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C363	1-164-145-11	CERAMIC CHIP	390PF	5%	50V
C364	1-162-936-11	CERAMIC CHIP	5PF	0.25PF	50V
C365	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C366	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C367	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C368	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C401	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C402	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C403	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C404	1-162-941-11	CERAMIC CHIP	10PF	0.5PF	50V
C405	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C406	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C407	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C408	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C409	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C410	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C411	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C412	1-126-246-11	ELECT CHIP	220uF	20%	4V
C413	1-164-182-11	CERAMIC CHIP	0.0033uF	10%	50V
C415	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C416	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C417	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C418	1-164-471-11	CERAMIC CHIP	680PF	5%	50V
C419	1-126-207-11	ELECT CHIP	33uF	20%	4V
C421	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C422	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C423	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C424	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C425	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C426	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C427	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C428	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C429	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C430	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C431	1-162-942-11	CERAMIC CHIP	12PF	5%	50V
C432	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C433	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C434	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C435	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C436	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C437	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C438	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C439	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C440	1-162-945-11	CERAMIC CHIP	22PF	5%	50V
C441	1-162-941-11	CERAMIC CHIP	10PF	0.5PF	50V
C442	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C443	1-162-946-11	CERAMIC CHIP	27PF	5%	50V
C444	1-162-956-11	CERAMIC CHIP	180PF	5%	50V
C445	1-162-954-11	CERAMIC CHIP	120PF	5%	50V
C446	1-162-946-11	CERAMIC CHIP	27PF	5%	50V
C447	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C449	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C450	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C451	1-163-263-11	CERAMIC CHIP	330PF	5%	50V
C452	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C453	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C454	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C455	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V

Ref. No.	Part No.	Description			Remark
C456	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C458	1-162-956-11	CERAMIC CHIP	180PF	5%	50V
C459	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C460	1-128-004-11	ELECT CHIP	10uF	20%	16V
C461	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C462	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C463	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C464	1-162-944-11	CERAMIC CHIP	18PF	5%	50V
C465	1-164-145-11	CERAMIC CHIP	390PF	5%	50V
C466	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C467	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C468	1-162-948-11	CERAMIC CHIP	39PF	5%	50V
C502	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C504	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C505	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C506	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C507	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C508	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C509	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C511	1-162-951-11	CERAMIC CHIP	68PF	5%	50V
C512	1-162-950-11	CERAMIC CHIP	56PF	5%	50V
C513	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C514	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C515	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C517	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C518	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C521	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C522	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C523	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C524	1-135-146-21	TANTALUM CHIP	0.68uF	20%	25V
C525	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C526	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C527	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C528	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C529	1-162-941-11	CERAMIC CHIP	10PF	0.5PF	50V
C530	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C531	1-162-910-11	CERAMIC CHIP	5PF	0.25PF	50V
C532	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C533	1-162-944-11	CERAMIC CHIP	18PF	5%	50V
C534	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C535	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C552	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C553	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C554	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C555	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C556	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C557	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C558	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C559	1-164-634-11	CERAMIC CHIP	1uF		16V
C560	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C561	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C562	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C563	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C564	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C566	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C567	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C568	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C569	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C570	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C571	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C572	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C573	1-164-634-11	CERAMIC CHIP	1uF		16V
C574	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C575	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C576	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C577	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C578	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C579	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C601	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C602	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C603	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C701	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C702	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C703	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C731	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C732	1-162-954-11	CERAMIC CHIP	120PF	5%	50V
C733	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C734	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C735	1-164-245-11	CERAMIC CHIP	0.015uF	10%	25V
C736	1-162-954-11	CERAMIC CHIP	120PF	5%	50V
C737	1-164-634-11	CERAMIC CHIP	1uF		16V
C738	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C739	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C740	1-162-638-11	CERAMIC CHIP	1uF		16V
C741	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C742	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C743	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C744	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C745	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C746	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C747	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C748	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C749	1-164-634-11	CERAMIC CHIP	1uF		16V
C750	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C751	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C752	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V

VC-106

Ref. No.	Part No.	Description	Remark
		< CONNECTOR >	
CN101	1-580-247-61	CONNECTOR, BOARD TO BOARD 18P	
CN251	* 1-565-529-21	PIN, CONNECTOR (PC BOARD) 4P	
CN302	1-580-086-41	CONNECTOR, BOARD TO BOARD 22P	
CN701	1-573-564-61	CONNECTOR, BOARD TO BOARD 32P	
		< TRIMMER >	
CT101	1-141-356-11	CAP, ADJ	
CT151	1-141-368-11	CAP, CHIP TRIMMER	
		< DIODE >	
D152	8-719-949-46	DIODE 1T32	
D153	8-719-404-46	DIODE MA110	
D251	8-719-404-46	DIODE MA110	
D253	8-719-404-46	DIODE MA110	
D254	8-719-404-46	DIODE MA110	
D351	8-719-404-46	DIODE MA110	
D401	8-719-421-03	DIODE MA732	
D402	8-719-404-35	DIODE MA141WK	
D403	8-719-820-05	DIODE 1SS181	
D404	8-719-820-05	DIODE 1SS181	
D405	8-719-404-35	DIODE MA141WK	
D406	8-719-404-46	DIODE MA110	
D551	8-719-404-46	DIODE MA110	
D552	8-719-404-35	DIODE MA141WK	
D553	8-719-404-46	DIODE MA110	
		< FILTER >	
FL201	1-236-759-21	FILTER, LOW PASS (TRAP)	
FL202	1-415-731-21	DELAY LINE, LC (YH)	
FL203	1-236-892-21	FILTER, LOW PASS	
FL204	1-415-732-21	DELAY LINE, LC (200NS)	
FL251	1-415-763-21	DELAY LINE, LC	
FL252	1-415-730-21	DELAY LINE, LC (100NS)	
FL351	1-236-850-21	FILTER, BAND PASS	
FL401	1-239-112-21	FILTER, LOW PASS (Y)	
FL402	1-236-775-11	FILTER, LOW PASS (DEM)	
FL501	1-239-110-11	FILTER, BAND PASS	
FL502	1-236-186-11	FILTER, BAND PASS	
FL503	1-579-371-11	FILTER, CERAMIC	
FL551	1-236-848-21	FILTER, LOW PASS	
FL552	1-239-010-11	FILTER, LOW PASS (CCD. PAL. Y)	
FL731	1-239-111-21	FILTER, LOW PASS	
		< HIC >	
HIC101	A-7068-194-A	HIC DT-77 BOARD, COMPLETE (Note. 1)	

Note 1

For replacement of CCD imager, CD-74 board, complete and DT-77 board, complete read carefully the CAUTIONS FOR REPLACEMENT OF CCD IMAGER on page 88.

Ref. No.	Part No.	Description	Remark
		< IC >	
IC151	8-752-339-77	IC CXD2111R-T3	
IC201	8-752-340-34	IC CXL1507AN	
IC202	8-752-332-69	IC CXL5504M	
IC203	8-752-038-97	IC CXA1391R	
IC204	8-759-946-00	IC MB88341PFV	
IC251	8-759-946-00	IC MB88341PFV	
IC252	8-752-056-04	IC CXA1609N	
IC253	8-752-039-49	IC CXA1393AN	
IC254	8-752-057-59	IC CXA1592R	
IC255	8-759-521-09	IC MB88346APFV	
IC256	8-759-512-59	IC MB88352PFV	
IC257	8-759-937-56	IC S-8054ALB-LM-S	
IC258	8-759-008-67	IC MC14066BF	
IC260	8-759-998-96	IC LM324D	
IC261	8-759-044-05	IC MC68HC11L6FUSC400607	
IC351	8-759-605-61	IC CXA1203N	
IC401	8-752-036-19	IC CXA1207AR	
IC501	8-752-036-20	IC CXA1208R	
IC551	8-752-333-24	IC CXL1506M	
IC552	8-752-333-24	IC CXL1506M	
IC701	8-752-348-74	IC CXD2104AN	
IC731	8-759-998-92	IC LM393D	
IC732	8-759-509-17	IC XRU4053BF	
IC733	8-759-998-98	IC LM358D	
		< COIL >	
L101	1-412-031-11	INDUCTOR CHIP 47uH	
L102	1-412-031-11	INDUCTOR CHIP 47uH	
L151	1-410-381-11	INDUCTOR CHIP 10uH	
L201	1-410-381-11	INDUCTOR CHIP 10uH	
L202	1-410-381-11	INDUCTOR CHIP 10uH	
L203	1-410-381-11	INDUCTOR CHIP 10uH	
L204	1-410-381-11	INDUCTOR CHIP 10uH	
L251	1-410-391-11	INDUCTOR CHIP 68uH	
L252	1-410-381-11	INDUCTOR CHIP 10uH	
L351	1-412-029-11	INDUCTOR CHIP 10uH	
L401	1-410-393-11	INDUCTOR CHIP 100uH	
L402	1-412-029-11	INDUCTOR CHIP 10uH	
L404	1-410-383-31	INDUCTOR CHIP 15uH	
L405	1-410-390-11	INDUCTOR CHIP 56uH	
L407	1-410-386-11	INDUCTOR CHIP 27uH	
L408	1-410-378-11	INDUCTOR CHIP 5. 6uH	
L410	1-410-386-11	INDUCTOR CHIP 27uH	
L411	1-410-376-21	INDUCTOR CHIP 3. 9uH	
L412	1-410-384-31	INDUCTOR CHIP 18uH	
L413	1-410-379-31	INDUCTOR CHIP 6. 8uH	
L414	1-410-390-11	INDUCTOR CHIP 56uH	

Ref. No.	Part No.	Description	Remark
L501	1-412-029-11	INDUCTOR CHIP 10uH	
L502	1-410-393-11	INDUCTOR CHIP 100uH	
L503	1-410-656-11	INDUCTOR CHIP 150uH	
L504	1-410-393-11	INDUCTOR CHIP 100uH	
L505	1-410-655-31	INDUCTOR CHIP 120uH	
L507	1-410-386-11	INDUCTOR CHIP 27uH	
L508	1-410-393-11	INDUCTOR CHIP 100uH	
L509	1-410-655-31	INDUCTOR CHIP 120uH	
L551	1-412-029-11	INDUCTOR CHIP 10uH	
L552	1-412-031-11	INDUCTOR CHIP 47uH	
L553	1-412-029-11	INDUCTOR CHIP 10uH	
L554	1-412-031-11	INDUCTOR CHIP 47uH	
L601	1-412-026-11	INDUCTOR CHIP 1uH	
L602	1-410-192-51	INDUCTOR CHIP 1uH	
L603	1-410-192-51	INDUCTOR CHIP 1uH	
L701	1-410-381-11	INDUCTOR CHIP 10uH	
L731	1-410-204-31	INDUCTOR CHIP 10uH	
L732	1-410-655-31	INDUCTOR CHIP 120uH	

< TRANSISTOR >

Ref. No.	Part No.	Description	Remark
Q101	8-729-907-46	TRANSISTOR IMZ1	
Q102	8-729-907-46	TRANSISTOR IMZ1	
Q103	8-729-907-46	TRANSISTOR IMZ1	
Q104	8-729-925-42	TRANSISTOR IMT2	
Q105	8-729-907-46	TRANSISTOR IMZ1	
Q106	8-729-907-46	TRANSISTOR IMZ1	
Q107	8-729-402-45	TRANSISTOR UN5212	
Q108	8-729-905-35	TRANSISTOR 2SC4081-R	
Q151	8-729-905-35	TRANSISTOR 2SC4081-R	
Q201	8-729-905-23	TRANSISTOR 2SA1576-R	
Q202	8-729-905-23	TRANSISTOR 2SA1576-R	
Q203	8-729-925-42	TRANSISTOR IMT2	
Q204	8-729-905-23	TRANSISTOR 2SA1576-R	
Q205	8-729-905-23	TRANSISTOR 2SA1576-R	
Q251	8-729-907-46	TRANSISTOR IMZ1	
Q252	8-729-905-18	TRANSISTOR DTC144EU	
Q253	8-729-905-23	TRANSISTOR 2SA1576-R	
Q254	8-729-905-35	TRANSISTOR 2SC4081-R	
Q255	8-729-907-46	TRANSISTOR IMZ1	
Q256	8-729-905-23	TRANSISTOR 2SA1576-R	
Q259	8-729-925-39	TRANSISTOR IMH8	
Q260	8-729-925-42	TRANSISTOR IMT2	
Q261	8-729-420-50	TRANSISTOR UN5215	
Q262	8-729-905-35	TRANSISTOR 2SC4081-R	
Q263	8-729-925-39	TRANSISTOR IMH8	
Q264	8-729-420-50	TRANSISTOR UN5215	
Q351	8-729-905-12	TRANSISTOR DTA144EU	
Q352	8-729-905-18	TRANSISTOR DTC144EU	
Q353	8-729-905-35	TRANSISTOR 2SC4081-R	
Q354	8-729-905-35	TRANSISTOR 2SC4081-R	
Q355	8-729-905-35	TRANSISTOR 2SC4081-R	
Q356	8-729-905-18	TRANSISTOR DTC144EU	
Q401	8-729-920-48	TRANSISTOR IMH2	
Q402	8-729-907-39	TRANSISTOR IMD2	
Q403	8-729-905-23	TRANSISTOR 2SA1576-R	
Q404	8-729-905-18	TRANSISTOR DTC144EU	
Q405	8-729-824-05	TRANSISTOR 3SK248	
Q406	8-729-905-18	TRANSISTOR DTC144EU	
Q408	8-729-905-12	TRANSISTOR DTA144EU	
Q409	8-729-824-02	TRANSISTOR 2SA1838-TL	
Q410	8-729-905-12	TRANSISTOR DTA144EU	
Q411	8-729-403-06	TRANSISTOR XN1113	
Q412	8-729-905-18	TRANSISTOR DTC144EU	
Q413	8-729-905-18	TRANSISTOR DTC144EU	
Q414	8-729-423-52	TRANSISTOR 2SC3931	
Q415	8-729-824-02	TRANSISTOR 2SA1838	
Q416	8-729-905-18	TRANSISTOR DTC144EU	
Q417	8-729-905-35	TRANSISTOR 2SC4081-R	
Q418	8-729-905-23	TRANSISTOR 2SA1576-R	
Q419	8-729-905-23	TRANSISTOR 2SA1576-R	
Q420	8-729-905-35	TRANSISTOR 2SC4081-R	
Q421	8-729-905-18	TRANSISTOR DTC144EU	
Q422	8-729-823-16	TRANSISTOR 2SC4555-5. 6. 7	
Q423	8-729-823-16	TRANSISTOR 2SC4555-5. 6. 7	
Q424	8-729-905-18	TRANSISTOR DTC144EU	
Q425	8-729-905-18	TRANSISTOR DTC144EU	
Q426	8-729-905-12	TRANSISTOR DTA144EU	
Q427	8-729-905-18	TRANSISTOR DTC144EU	
Q428	8-729-905-18	TRANSISTOR DTC144EU	
Q429	8-729-905-18	TRANSISTOR DTC144EU	
Q430	8-729-423-52	TRANSISTOR 2SC3931	
Q431	8-729-423-52	TRANSISTOR 2SC3931	
Q432	8-729-907-26	TRANSISTOR IMX1	
Q433	8-729-905-35	TRANSISTOR 2SC4081-R	
Q434	8-729-905-35	TRANSISTOR 2SC4081-R	
Q435	8-729-905-12	TRANSISTOR DTA144EU	
Q437	8-729-403-06	TRANSISTOR XN1113	
Q438	8-729-423-52	TRANSISTOR 2SC3931	
Q439	8-729-920-99	TRANSISTOR DTA114EU	
Q440	8-729-905-23	TRANSISTOR 2SA1576-R	
Q441	8-729-403-06	TRANSISTOR XN1113	
Q442	8-729-403-07	TRANSISTOR XN1213	
Q443	8-729-905-18	TRANSISTOR DTC144EU	
Q444	8-729-905-18	TRANSISTOR DTC144EU	
Q446	8-729-905-18	TRANSISTOR DTC144EU	
Q447	8-729-905-18	TRANSISTOR DTC144EU	
Q501	8-729-905-35	TRANSISTOR 2SC4081-R	
Q502	8-729-905-35	TRANSISTOR 2SC4081-R	

VC-106

Ref. No.	Part No.	Description				Remark
Q505	8-729-905-23	TRANSISTOR	2SA1576-R			
Q506	8-729-905-35	TRANSISTOR	2SC4081-R			
Q507	8-729-905-35	TRANSISTOR	2SC4081-R			
Q508	8-729-905-35	TRANSISTOR	2SC4081-R			
Q509	8-729-905-12	TRANSISTOR	DTA144EU			
Q510	8-729-423-52	TRANSISTOR	2SC3931			
Q511	8-729-905-18	TRANSISTOR	DTC144EU			
Q512	8-729-905-35	TRANSISTOR	2SC4081-R			
Q513	8-729-905-18	TRANSISTOR	DTC144EU			
Q514	8-729-905-18	TRANSISTOR	DTC144EU			
Q551	8-729-807-87	TRANSISTOR	2SB1295-UL6			
Q552	8-729-905-18	TRANSISTOR	DTC144EU			
Q553	8-729-807-87	TRANSISTOR	2SB1295-UL6			
Q554	8-729-905-18	TRANSISTOR	DTC144EU			
Q555	8-729-905-23	TRANSISTOR	2SA1576-R			
Q556	8-729-905-35	TRANSISTOR	2SC4081-R			
Q557	8-729-905-35	TRANSISTOR	2SC4081-R			
Q558	8-729-905-18	TRANSISTOR	DTC144EU			
Q559	8-729-905-23	TRANSISTOR	2SA1576-R			
Q560	8-729-905-35	TRANSISTOR	2SC4081-R			
Q701	8-729-907-46	TRANSISTOR	IMZ1			
Q731	8-729-920-59	TRANSISTOR	IMX2			
Q733	8-729-905-35	TRANSISTOR	2SC4081-R			
Q734	8-729-905-23	TRANSISTOR	2SA1576-R			
Q735	8-729-920-59	TRANSISTOR	IMX2			
Q736	8-729-920-59	TRANSISTOR	IMX2			
Q737	8-729-907-46	TRANSISTOR	IMZ1			
Q738	8-729-905-23	TRANSISTOR	2SA1576-R			
Q739	8-729-905-35	TRANSISTOR	2SC4081-R			
Q740	8-729-920-59	TRANSISTOR	IMX2			
Q741	8-729-905-35	TRANSISTOR	2SC4081-R			
		< RESISTOR >				
R101	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R102	1-216-864-11	METAL CHIP	0	5%	1/16W	
R103	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R104	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R105	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R106	1-216-864-11	METAL CHIP	0	5%	1/16W	
R107	1-216-795-11	METAL CHIP	6.8K	0.50%	1/16W	
R108	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R109	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R110	1-216-795-11	METAL CHIP	6.8K	0.50%	1/16W	
R111	1-216-864-11	METAL CHIP	0	5%	1/16W	
R113	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R114	1-216-864-11	METAL CHIP	0	5%	1/16W	
R115	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R116	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R118	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R119	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R120	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R121	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R122	1-216-820-11	METAL CHIP	820	5%	1/16W	
R123	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R124	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R125	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R126	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R127	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R129	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R130	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R131	1-216-822-11	METAL CHIP	1.2K	5%	1/16W	
R132	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R133	1-216-842-11	METAL CHIP	56K	5%	1/16W	
R134	1-216-864-11	METAL CHIP	0	5%	1/16W	
R135	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R136	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R137	1-216-840-11	METAL CHIP	39K	5%	1/16W	
R138	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R139	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R140	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R141	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R142	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R143	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R144	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R151	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R152	1-216-811-11	METAL CHIP	150	5%	1/16W	
R153	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R154	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R155	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R156	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R157	1-216-864-11	METAL CHIP	0	5%	1/16W	
R158	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R159	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R160	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R163	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R168	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R169	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R170	1-216-849-11	METAL CHIP	220K	5%	1/16W	
R171	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R172	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R175	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R176	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R177	1-216-864-11	METAL CHIP	0	5%	1/16W	
R178	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R182	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R201	1-216-820-11	METAL CHIP	820	5%	1/16W	
R203	1-216-864-11	METAL CHIP	0	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R205	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R206	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R208	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R209	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R211	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R212	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R213	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R214	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R215	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R216	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R217	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R218	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R219	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R220	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R221	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R223	1-216-864-11	METAL CHIP	0	5%	1/16W	
R224	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R226	1-216-840-11	METAL CHIP	39K	5%	1/16W	
R227	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R228	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R229	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R231	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R232	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R233	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R234	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R235	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R241	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R242	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R243	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R244	1-216-847-11	METAL CHIP	150K	5%	1/16W	
R245	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R251	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R256	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R258	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R259	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R266	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R267	1-216-840-11	METAL CHIP	39K	5%	1/16W	
R268	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R269	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R270	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R273	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R274	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R275	1-216-864-11	METAL CHIP	0	5%	1/16W	
R276	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R277	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R278	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R279	1-216-822-11	METAL CHIP	1.2K	5%	1/16W	
R280	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R281	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R282	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R284	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R285	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R286	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R288	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R289	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R290	1-216-817-11	METAL CHIP	470	5%	1/16W	
R291	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R294	1-216-864-11	METAL CHIP	0	5%	1/16W	
R297	1-216-864-11	METAL CHIP	0	5%	1/16W	
R301	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R302	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R303	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R304	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R305	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R306	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R307	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R308	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R309	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R310	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R311	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R312	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R313	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R314	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R315	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R316	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R318	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R319	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R320	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R322	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R323	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R324	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R325	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R326	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R327	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R328	1-216-819-11	METAL CHIP	680	5%	1/16W	
R329	1-216-819-11	METAL CHIP	680	5%	1/16W	
R330	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R331	1-216-819-11	METAL CHIP	680	5%	1/16W	
R332	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R333	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R334	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R335	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R336	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R338	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R339	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R340	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R343	1-216-857-11	METAL CHIP	1M	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R344	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R347	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R349	1-216-840-11	METAL CHIP	39K	5%	1/16W	
R352	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R353	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R354	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R355	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R356	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R357	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R358	1-216-699-11	METAL CHIP	100K	0.5%	1/10W	
R359	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R360	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R361	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
R362	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R363	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R364	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R365	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R366	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R367	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R368	1-216-819-11	METAL CHIP	680	5%	1/16W	
R369	1-216-817-11	METAL CHIP	470	5%	1/16W	
R370	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R371	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R372	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R373	1-216-826-11	METAL CHIP	2.7K	5%	1/16W	
R374	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R375	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R377	1-216-864-11	METAL CHIP	0	5%	1/16W	
R378	1-216-819-11	METAL CHIP	680	5%	1/16W	
R400	1-216-864-11	METAL CHIP	0	5%	1/16W	
R401	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R402	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R403	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R404	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
R405	1-216-856-11	METAL CHIP	820K	5%	1/16W	
R406	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R407	1-216-817-11	METAL CHIP	470	5%	1/16W	
R408	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R409	1-216-820-11	METAL CHIP	820	5%	1/16W	
R410	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R411	1-216-804-11	METAL CHIP	39	5%	1/16W	
R412	1-216-803-11	METAL CHIP	33	5%	1/16W	
R413	1-216-699-11	METAL CHIP	100K	0.5%	1/10W	
R414	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R415	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R417	1-216-850-11	METAL CHIP	270K	5%	1/16W	
R419	1-216-818-11	METAL CHIP	560	5%	1/16W	
R420	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R421	1-216-839-11	METAL CHIP	33K	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R422	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R423	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R425	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R426	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R427	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R428	1-216-653-11	METAL CHIP	1.2K	0.5%	1/10W	
R429	1-216-663-11	METAL CHIP	3.3K	0.5%	1/10W	
R430	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R431	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R432	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R433	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
R434	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R435	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R436	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R437	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R438	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R439	1-216-838-11	METAL CHIP	27K	5%	1/16W	
R440	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R441	1-216-815-11	METAL CHIP	330	5%	1/16W	
R442	1-216-814-11	METAL CHIP	270	5%	1/16W	
R443	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
R444	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R445	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R446	1-216-814-11	METAL CHIP	270	5%	1/16W	
R447	1-216-813-11	METAL CHIP	220	5%	1/16W	
R448	1-216-813-11	METAL CHIP	220	5%	1/16W	
R449	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R450	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R451	1-216-813-11	METAL CHIP	220	5%	1/16W	
R452	1-216-816-11	METAL CHIP	390	5%	1/16W	
R453	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R454	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R455	1-216-817-11	METAL CHIP	470	5%	1/16W	
R457	1-216-815-11	METAL CHIP	330	5%	1/16W	
R458	1-216-817-11	METAL CHIP	470	5%	1/16W	
R459	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R460	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R461	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R462	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R463	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R464	1-216-643-11	METAL CHIP	470	0.5%	1/10W	
R465	1-216-641-11	METAL CHIP	390	0.5%	1/10W	
R466	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R467	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R468	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R469	1-216-663-11	METAL CHIP	3.3K	0.5%	1/10W	
R470	1-216-667-11	METAL CHIP	4.7K	0.5%	1/10W	
R471	1-216-647-11	METAL CHIP	680	0.5%	1/10W	
R472	1-216-844-11	METAL CHIP	82K	5%	1/16W	

Ref. No.	Part No.	Description			Remark
R473	1-216-844-11	METAL CHIP	82K	5%	1/16W
R474	1-216-667-11	METAL CHIP	4.7K	0.5%	1/10W
R475	1-216-849-11	METAL CHIP	220K	5%	1/16W
R476	1-216-665-11	METAL CHIP	3.9K	0.5%	1/10W
R477	1-216-649-11	METAL CHIP	820	0.5%	1/10W
R478	1-216-833-11	METAL CHIP	10K	5%	1/16W
R479	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R480	1-216-826-11	METAL CHIP	2.7K	5%	1/16W
R481	1-216-821-11	METAL CHIP	1K	5%	1/16W
R482	1-216-821-11	METAL CHIP	1K	5%	1/16W
R483	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R484	1-216-826-11	METAL CHIP	2.7K	5%	1/16W
R485	1-216-821-11	METAL CHIP	1K	5%	1/16W
R486	1-216-819-11	METAL CHIP	680	5%	1/16W
R487	1-216-817-11	METAL CHIP	470	5%	1/16W
R488	1-216-836-11	METAL CHIP	18K	5%	1/16W
R489	1-216-837-11	METAL CHIP	22K	5%	1/16W
R490	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R491	1-216-813-11	METAL CHIP	220	5%	1/16W
R492	1-216-813-11	METAL CHIP	220	5%	1/16W
R493	1-216-814-11	METAL CHIP	270	5%	1/16W
R494	1-216-828-11	METAL CHIP	3.9K	5%	1/16W
R495	1-216-817-11	METAL CHIP	470	5%	1/16W
R497	1-216-822-11	METAL CHIP	1.2K	5%	1/16W
R498	1-216-813-11	METAL CHIP	220	5%	1/16W
R499	1-216-817-11	METAL CHIP	470	5%	1/16W
R500	1-216-815-11	METAL CHIP	330	5%	1/16W
R501	1-216-819-11	METAL CHIP	680	5%	1/16W
R502	1-216-836-11	METAL CHIP	18K	5%	1/16W
R503	1-216-841-11	METAL CHIP	47K	5%	1/16W
R504	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R505	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R507	1-216-864-11	METAL CHIP	0	5%	1/16W
R509	1-216-864-11	METAL CHIP	0	5%	1/16W
R510	1-216-833-11	METAL CHIP	10K	5%	1/16W
R511	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R512	1-216-815-11	METAL CHIP	330	5%	1/16W
R513	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R514	1-216-821-11	METAL CHIP	1K	5%	1/16W
R516	1-216-821-11	METAL CHIP	1K	5%	1/16W
R517	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R518	1-216-833-11	METAL CHIP	10K	5%	1/16W
R520	1-216-699-11	METAL CHIP	100K	0.5%	1/10W
R521	1-216-821-11	METAL CHIP	1K	5%	1/16W
R522	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R523	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R524	1-216-828-11	METAL CHIP	3.9K	5%	1/16W
R525	1-216-830-11	METAL CHIP	5.6K	5%	1/16W
R526	1-216-829-11	METAL CHIP	4.7K	5%	1/16W

Ref. No.	Part No.	Description			Remark
R527	1-216-830-11	METAL CHIP	5.6K	5%	1/16W
R528	1-216-830-11	METAL CHIP	5.6K	5%	1/16W
R529	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R530	1-216-817-11	METAL CHIP	470	5%	1/16W
R531	1-216-834-11	METAL CHIP	12K	5%	1/16W
R532	1-216-834-11	METAL CHIP	12K	5%	1/16W
R533	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R534	1-216-864-11	METAL CHIP	0	5%	1/16W
R535	1-216-823-11	METAL CHIP	1.5K	5%	1/16W
R536	1-216-824-11	METAL CHIP	1.8K	5%	1/16W
R537	1-216-822-11	METAL CHIP	1.2K	5%	1/16W
R540	1-216-845-11	METAL CHIP	100K	5%	1/16W
R541	1-216-826-11	METAL CHIP	2.7K	5%	1/16W
R542	1-216-807-11	METAL CHIP	68	5%	1/16W
R543	1-216-823-11	METAL CHIP	1.5K	5%	1/16W
R544	1-216-837-11	METAL CHIP	22K	5%	1/16W
R545	1-216-809-11	METAL CHIP	100	5%	1/16W
R546	1-216-845-11	METAL CHIP	100K	5%	1/16W
R547	1-216-864-11	METAL CHIP	0	5%	1/16W
R549	1-216-842-11	METAL CHIP	56K	5%	1/16W
R550	1-216-841-11	METAL CHIP	47K	5%	1/16W
R551	1-216-833-11	METAL CHIP	10K	5%	1/16W
R552	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R553	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R554	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R555	1-216-810-11	METAL CHIP	120	5%	1/16W
R556	1-216-844-11	METAL CHIP	82K	5%	1/16W
R557	1-216-864-11	METAL CHIP	0	5%	1/16W
R559	1-216-857-11	METAL CHIP	1M	5%	1/16W
R561	1-216-864-11	METAL CHIP	0	5%	1/16W
R563	1-216-839-11	METAL CHIP	33K	5%	1/16W
R564	1-216-842-11	METAL CHIP	56K	5%	1/16W
R565	1-216-817-11	METAL CHIP	470	5%	1/16W
R566	1-216-821-11	METAL CHIP	1K	5%	1/16W
R567	1-216-821-11	METAL CHIP	1K	5%	1/16W
R568	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R569	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R570	1-216-821-11	METAL CHIP	1K	5%	1/16W
R571	1-216-821-11	METAL CHIP	1K	5%	1/16W
R572	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R573	1-216-810-11	METAL CHIP	120	5%	1/16W
R574	1-216-844-11	METAL CHIP	82K	5%	1/16W
R575	1-216-864-11	METAL CHIP	0	5%	1/16W
R577	1-216-853-11	METAL CHIP	470K	5%	1/16W
R578	1-216-857-11	METAL CHIP	1M	5%	1/16W
R579	1-216-864-11	METAL CHIP	0	5%	1/16W
R580	1-216-839-11	METAL CHIP	33K	5%	1/16W
R581	1-216-842-11	METAL CHIP	56K	5%	1/16W

Ref. No.	Part No.	Description			Remark
R582	1-216-817-11	METAL CHIP	470	5%	1/16W
R583	1-216-826-11	METAL CHIP	2.7K	5%	1/16W
R584	1-216-821-11	METAL CHIP	1K	5%	1/16W
R585	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R586	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R587	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R588	1-216-818-11	METAL CHIP	560	5%	1/16W
R612	1-216-819-11	METAL CHIP	680	5%	1/16W
R613	1-216-819-11	METAL CHIP	680	5%	1/16W
R614	1-216-819-11	METAL CHIP	680	5%	1/16W
R616	1-216-864-11	METAL CHIP	0	5%	1/16W
R617	1-216-833-11	METAL CHIP	10K	5%	1/16W
R618	1-216-833-11	METAL CHIP	10K	5%	1/16W
R622	1-216-864-11	METAL CHIP	0	5%	1/16W
R626	1-216-864-11	METAL CHIP	0	5%	1/16W
R628	1-216-864-11	METAL CHIP	0	5%	1/16W
R702	1-216-821-11	METAL CHIP	1K	5%	1/16W
R703	1-216-821-11	METAL CHIP	1K	5%	1/16W
R704	1-216-821-11	METAL CHIP	1K	5%	1/16W
R705	1-216-821-11	METAL CHIP	1K	5%	1/16W
R706	1-216-864-11	METAL CHIP	0	5%	1/16W
R707	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R708	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R709	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R710	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R731	1-216-823-11	METAL CHIP	1.5K	5%	1/16W
R732	1-216-818-11	METAL CHIP	560	5%	1/16W
R733	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R734	1-216-835-11	METAL CHIP	15K	5%	1/16W
R735	1-216-857-11	METAL CHIP	1M	5%	1/16W
R736	1-216-821-11	METAL CHIP	1K	5%	1/16W
R737	1-216-821-11	METAL CHIP	1K	5%	1/16W
R738	1-216-838-11	METAL CHIP	27K	5%	1/16W
R739	1-216-843-11	METAL CHIP	68K	5%	1/16W
R740	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R741	1-216-830-11	METAL CHIP	5.6K	5%	1/16W
R742	1-216-820-11	METAL CHIP	820	5%	1/16W
R743	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R744	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R745	1-216-821-11	METAL CHIP	1K	5%	1/16W
R746	1-216-835-11	METAL CHIP	15K	5%	1/16W
R747	1-216-857-11	METAL CHIP	1M	5%	1/16W
R749	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R750	1-216-821-11	METAL CHIP	1K	5%	1/16W
R751	1-216-842-11	METAL CHIP	56K	5%	1/16W
R752	1-216-833-11	METAL CHIP	10K	5%	1/16W
R753	1-216-840-11	METAL CHIP	39K	5%	1/16W
R754	1-216-817-11	METAL CHIP	470	5%	1/16W
R755	1-216-817-11	METAL CHIP	470	5%	1/16W

Ref. No.	Part No.	Description			Remark
R756	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R757	1-216-821-11	METAL CHIP	1K	5%	1/16W
R758	1-216-814-11	METAL CHIP	270	5%	1/16W
R759	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R760	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R761	1-216-843-11	METAL CHIP	68K	5%	1/16W
R762	1-216-851-11	METAL CHIP	330K	5%	1/16W
R763	1-216-853-11	METAL CHIP	470K	5%	1/16W
R764	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R765	1-216-813-11	METAL CHIP	220	5%	1/16W
R766	1-216-814-11	METAL CHIP	270	5%	1/16W
R767	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R768	1-216-843-11	METAL CHIP	68K	5%	1/16W
R769	1-216-847-11	METAL CHIP	150K	5%	1/16W
R770	1-216-856-11	METAL CHIP	820K	5%	1/16W
R771	1-216-821-11	METAL CHIP	1K	5%	1/16W
R772	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R773	1-216-842-11	METAL CHIP	56K	5%	1/16W
R774	1-216-833-11	METAL CHIP	10K	5%	1/16W
R775	1-216-815-11	METAL CHIP	330	5%	1/16W
R776	1-216-851-11	METAL CHIP	330K	5%	1/16W
R777	1-216-821-11	METAL CHIP	1K	5%	1/16W
R778	1-216-830-11	METAL CHIP	5.6K	5%	1/16W

< VARIABLE RESISTOR >

Ref. No.	Part No.	Description
RV351	1-238-087-11	RES, ADJ, CERMET 1K
RV352	1-238-090-11	RES, ADJ, CERMET 10K
RV401	1-238-091-11	RES, ADJ, CERMET 22K
RV402	1-238-092-11	RES, ADJ, CERMET 47K
RV403	1-238-092-11	RES, ADJ, CERMET 47K
RV404	1-238-089-11	RES, ADJ, CERMET 4.7K
RV405	1-238-089-11	RES, ADJ, CERMET 4.7K
RV406	1-238-091-11	RES, ADJ, CERMET 22K
RV407	1-238-089-11	RES, ADJ, CERMET 4.7K
RV408	1-238-091-11	RES, ADJ, CERMET 22K
RV409	1-238-240-11	RES, ADJ, CERMET 220
RV410	1-238-086-11	RES, ADJ, CERMET 470
RV411	1-238-086-11	RES, ADJ, CERMET 470
RV501	1-238-240-11	RES, ADJ, CERMET 220
RV551	1-238-086-11	RES, ADJ, CERMET 470

< FLEXIBLE BOARD >

Ref. No.	Part No.	Description
W101	1-639-618-11	FP-383 FLEXIBLE BOARD
W301	1-639-623-11	FP-380 FLEXIBLE BOARD
W401	1-639-615-11	FP-379 FLEXIBLE BOARD

< VIBRATOR >

Ref. No.	Part No.	Description
X101	1-579-076-11	VIBRATOR, CRYSTAL (28.375MHz)
X151	1-567-733-11	VIBRATOR, CRYSTAL (17MHz)

Ref. No.	Part No.	Description			Remark
X251	1-578-689-21	VIBRATOR, CRYSTAL (8MHz)			
X501	1-577-117-21	OSCILLATOR, CRYSTAL (4.433619MHz)			

****

* A-7062-393-A VF-40P BOARD, COMPLETE

****

(Ref. No 7,000 Series)

* 3-747-126-01 HOLDER, LED

< CAPACITOR >

C951	1-124-442-00	ELECT	330uF	20%	6.3V
C953	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C954	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C955	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C956	1-131-381-00	TANTALUM	47uF	10%	10V
C957	1-163-081-00	CERAMIC CHIP	0.22uF		25V
C958	1-136-718-11	FILM, CHIP	0.1uF	5%	25V
C959	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C960	1-127-515-11	ELECT(SOLID)	47uF	20%	6.3V
C961 ⚠·	1-163-205-00	CERAMIC CHIP	0.001uF	5%	50V
C962 ⚠·	1-162-625-11	CERAMIC CHIP	0.0047uF	5%	50V
C963 ⚠·	1-162-625-11	CERAMIC CHIP	0.0047uF	5%	50V
C965	1-126-090-11	ELECT	82uF	20%	10V
C966	1-124-257-00	ELECT	2.2uF	20%	50V
C968	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C969	1-164-611-11	CERAMIC CHIP	0.001uF	10%	500V

< CONNECTOR >

CN951	* 1-566-759-11	PIN, CONNECTOR (PC BOARD) 4P
CN952	* 1-566-195-11	PIN, CONNECTOR (PC BOARD) 2P
CN953	* 1-566-195-11	PIN, CONNECTOR (PC BOARD) 2P

< DIODE >

D951	8-719-820-65	DIODE TLS221
D952	8-719-984-02	LED BR4371F
D953	8-719-400-20	DIODE MA152WA-TX

< IC >

IC951	8-759-420-01	IC AN2512S

< COIL >

L951	1-408-976-21	INDUCTOR 33uH
L952	1-408-785-21	INDUCTOR CHIP 47uH
L953 ⚠·	1-459-876-41	COIL, FERRITE (HLC)

Ref. No.	Part No.	Description			Remark

< TRANSISTOR >

Q953	8-729-216-22	TRANSISTOR	2SA1162
Q954	8-729-100-67	TRANSISTOR	2SC1623-L7
Q955	8-729-106-68	TRANSISTOR	2SD1615A-GP

< RESISTOR >

R953	1-216-041-00	METAL CHIP	470	5%	1/10W
R955	1-216-003-11	METAL GLAZE	12	5%	1/10W
R956	1-216-121-00	METAL CHIP	1M	5%	1/10W
R957	1-216-033-00	METAL CHIP	220	5%	1/10W
R958	1-216-097-00	METAL CHIP	100K	5%	1/10W
R959	1-216-113-00	METAL CHIP	470K	5%	1/10W
R960	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R961	1-216-160-00	METAL GLAZE	27	5%	1/8W
R962	1-216-336-11	METAL CHIP	47K	1%	1/10W
R963	1-216-107-00	METAL CHIP	270K	5%	1/10W
R964	1-216-025-00	METAL CHIP	100	5%	1/10W
R965	1-216-308-00	METAL CHIP	4.7	5%	1/10W
R967	1-216-047-00	METAL CHIP	820	5%	1/10W
R968	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R969	1-216-748-11	METAL CHIP	39K	1%	1/10W
R970	1-216-748-11	METAL CHIP	39K	1%	1/10W
R972	1-216-101-00	METAL CHIP	150K	5%	1/10W
R973	1-216-121-00	METAL CHIP	1M	5%	1/10W
R974	1-216-131-11	METAL CHIP	2.7M	5%	1/10W
R975	1-216-131-11	METAL CHIP	2.7M	5%	1/10W
R976	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R978	1-216-041-00	METAL CHIP	470	5%	1/10W
R983	1-216-121-00	METAL CHIP	1M	5%	1/10W

< VARIABLE RESISTOR >

RV951	1-238-092-11	RES, ADJ, CERMET 47K
RV952	1-238-086-11	RES, ADJ, CERMET 470
RV953	1-238-088-11	RES, ADJ, CERMET 2.2K
RV954	1-228-762-00	RES, ADJ, METAL GLAZE 1M

< TRANSFORMER >

T951 ⚠·	1-439-486-11	TRANSFORMER ASSY, FLYBACK

< THERMISTOR >

TH951	1-807-938-11	THERMISTOR

< SOCKET >

W951 ⚠·	1-540-019-21	SOCKET ASSY, CRT

****

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description			Remark
	A-7062-901-A	VS-87 BOARD, COMPLETE			
		**********************			
		(Ref.No 5,000 Series)			
	1-630-591-11	FP-182 FLEXIBLE BOARD			
*	3-942-968-01	CASE (LOWER), SHIELD, RP			
*	3-942-969-01	CASE (UPPER), SHIELD, RP			
		< CAPACITOR >			
C001	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C004	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C005	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C006	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C007	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C009	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C010	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C011	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C012	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C013	1-164-217-11	CERAMIC CHIP	150PF	0.25PF	50V
C014	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C015	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C016	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C017	1-162-914-11	CERAMIC CHIP	9PF	0.5PF	50V
C018	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C020	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C021	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C022	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C023	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C024	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C025	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C026	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C027	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C028	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C029	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C030	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C031	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C032	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C033	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C034	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C035	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C036	1-164-217-11	CERAMIC CHIP	150PF	0.25PF	50V
C037	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C038	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C039	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C040	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C041	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C042	1-162-914-11	CERAMIC CHIP	9PF	0.5PF	50V
C044	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C045	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C046	1-162-914-11	CERAMIC CHIP	9PF	0.5PF	50V
C047	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C048	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C049	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C050	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C051	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C052	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C053	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C054	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C055	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C057	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C058	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C059	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C060	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C062	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C063	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C064	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C065	1-164-217-11	CERAMIC CHIP	150PF	0.25PF	50V
C066	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C067	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C068	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C069	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C070	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C071	1-162-914-11	CERAMIC CHIP	9PF	0.5PF	50V
C073	1-162-914-11	CERAMIC CHIP	9PF	0.5PF	50V
C074	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C075	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C076	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C077	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C078	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C079	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C080	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C081	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C082	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C083	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C084	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C085	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C086	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C087	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C088	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C089	1-164-217-11	CERAMIC CHIP	150PF	0.25PF	50V
C090	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C091	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C092	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C093	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C094	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C095	1-162-914-11	CERAMIC CHIP	9PF	0.5PF	50V
C097	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C098	1-135-091-00	TANTALUM CHIP	1uF	20%	16V

Ref. No.	Part No.	Description		Remark	
C099	1-162-914-11	CERAMIC CHIP	9PF	0.5PF	50V
C100	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C101	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C102	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C103	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C104	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C105	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C106	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C109	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C110	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C111	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C112	1-162-926-11	CERAMIC CHIP	82PF	5%	50V
C113	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C114	1-164-217-11	CERAMIC CHIP	150PF	0.25PF	50V
C151	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C152	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C153	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C154	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C155	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C156	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C157	1-162-958-11	CERAMIC CHIP	270PF	5%	50V
C158	1-162-944-11	CERAMIC CHIP	18PF	5%	50V
C159	1-162-948-11	CERAMIC CHIP	39PF	5%	50V
C160	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C161	1-162-941-11	CERAMIC CHIP	10PF	0.5PF	50V
C162	1-162-910-11	CERAMIC CHIP	5PF	0.25PF	50V
C163	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C164	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C166	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C167	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C168	1-162-910-11	CERAMIC CHIP	5PF	0.25PF	50V
C169	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C170	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C171	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C172	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C173	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C174	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C175	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C176	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C177	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C178	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C179	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C180	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C181	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C182	1-162-920-11	CERAMIC CHIP	27PF	5%	50V
C183	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C184	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C185	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C186	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V

Ref. No.	Part No.	Description		Remark	
C187	1-162-916-11	CERAMIC CHIP	12PF	5%	50V
C188	1-162-905-11	CERAMIC CHIP	1PF	0.25PF	50V
C189	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C190	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C191	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C192	1-162-918-11	CERAMIC CHIP	18PF	5%	50V
C193	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C194	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C195	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C196	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C197	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C198	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C199	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C200	1-164-218-11	CERAMIC CHIP	180PF	0.25PF	50V
C202	1-162-922-11	CERAMIC CHIP	39PF	5%	50V
C203	1-162-926-11	CERAMIC CHIP	82PF	5%	50V
C204	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C205	1-162-925-11	CERAMIC CHIP	68PF	5%	50V
C206	1-164-218-11	CERAMIC CHIP	180PF	0.25PF	50V
C208	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C209	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C210	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C211	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C212	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C213	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C214	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C215	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C216	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C217	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C218	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C219	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C220	1-162-976-11	CERAMIC CHIP	75PF	5%	50V
C240	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C301	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C302	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C303	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C304	1-162-944-11	CERAMIC CHIP	18PF	5%	50V
C305	1-164-634-11	CERAMIC CHIP	1uF		16V
C307	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C308	1-162-971-11	CERAMIC CHIP	0.001uF		50V
C309	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C310	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C311	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C312	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C313	1-126-246-11	ELECT CHIP	220uF	20%	4V
C314	1-162-971-11	CERAMIC CHIP	0.001uF		50V
C315	1-162-971-11	CERAMIC CHIP	0.001uF		50V
C316	1-164-005-11	CERAMIC CHIP	0.47uF		25V

Ref. No.	Part No.	Description			Remark
C317	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C318	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C319	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C320	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C321	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C322	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C601	1-162-638-11	CERAMIC CHIP	1uF		16V
C602	1-162-638-11	CERAMIC CHIP	1uF		16V
C603	1-162-911-11	CERAMIC CHIP	6PF	0.5PF	50V
C604	1-162-916-11	CERAMIC CHIP	12PF	5%	50V
C605	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C606	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C607	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C608	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C609	1-162-638-11	CERAMIC CHIP	1uF		16V
C610	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C611	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C612	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C613	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C614	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C615	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C616	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C617	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C618	1-164-173-11	CERAMIC CHIP	0.0039uF	10%	50V
C619	1-162-638-11	CERAMIC CHIP	1uF		16V
C620	1-164-634-11	CERAMIC CHIP	1uF		16V
C621	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C622	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C623	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C624	1-162-638-11	CERAMIC CHIP	1uF		16V
C625	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C626	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C627	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C628	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C629	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C630	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C631	1-162-965-11	CERAMIC CHIP	0.0015uF	10%	50V
C633	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C634	1-162-638-11	CERAMIC CHIP	1uF		16V
C635	1-162-638-11	CERAMIC CHIP	1uF		16V
C636	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C637	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C638	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C639	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C641	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C642	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C643	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C644	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C645	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C646	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C647	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C648	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C649	1-164-157-11	CERAMIC CHIP	0.068uF	10%	25V
C650	1-164-157-11	CERAMIC CHIP	0.068uF	10%	25V
C651	1-164-634-11	CERAMIC CHIP	1uF		16V
C652	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C653	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C654	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C655	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C656	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C657	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C658	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C659	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C660	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C661	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C662	1-164-634-11	CERAMIC CHIP	1uF		16V
C663	1-164-634-11	CERAMIC CHIP	1uF		16V
C664	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C665	1-135-092-21	TANTALUM CHIP	3.3uF	10%	16V
C666	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C667	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C668	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C669	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C670	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C671	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C672	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C673	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C674	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C675	1-162-638-11	CERAMIC CHIP	1uF		16V
C676	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C677	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C678	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C679	1-162-918-11	CERAMIC CHIP	18PF	5%	50V
C680	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C681	1-162-638-11	CERAMIC CHIP	1uF		16V
C682	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C683	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C686	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C688	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C689	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C690	1-135-211-11	TANTAL. CHIP	6.8uF	20%	6.3V
C692	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C693	1-162-965-11	CERAMIC CHIP	0.0015uF	10%	50V
C695	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C696	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V

Ref. No.		Part No.	Description	Remark
			< CONNECTOR >	
CN001		1-566-531-11	CONNECTOR, FPC (ZIF) 15P	
CN002		1-580-265-61	CONNECTOR, BOARD TO BOARD 16P	
CN301	*	1-565-876-11	PIN, CONNECTOR (PC BOARD) 4P	
CN302		1-580-269-61	CONNECTOR, BOARD TO BOARD 24P	
CN303		1-566-530-11	CONNECTOR, FPC (ZIF) 14P	
CN304		1-580-247-41	CONNECTOR, BOARD TO BOARD 18P	
CN305		1-580-249-41	CONNECTOR, BOARD TO BOARD 24P	
CN502		1-565-662-11	CONNECTOR (PC BOARD) 15P	
CN601		1-566-538-11	CONNECTOR, FPC (NON ZIF) 6P	
CN602		1-569-363-21	CONNECTOR, FPC 15P	
CN603		1-565-527-11	PIN, CONNECTOR (PC BOARD) 2P	
CN604		1-566-541-11	CONNECTOR, FPC (NON ZIF) 9P	
CN606		1-580-263-41	CONNECTOR, BOARD TO BOARD 12P	
CN609		1-580-248-41	CONNECTOR, BOARD TO BOARD 20P	
CN610		1-580-086-41	CONNECTOR, BOARD TO BOARD 22P	
			< DIODE >	
D001		8-719-404-46	DIODE MA110	
D002		8-719-404-46	DIODE MA110	
D003		8-719-404-46	DIODE MA110	
D004		8-719-404-46	DIODE MA110	
D151		8-719-404-46	DIODE MA110	
D152		8-719-800-76	DIODE 1SS226	
D153		8-719-800-76	DIODE 1SS226	
D154		8-719-404-46	DIODE MA110	
D155		8-719-404-46	DIODE MA110	
D156		8-719-800-76	DIODE 1SS226	
D157		8-719-404-46	DIODE MA110	
D301		8-719-404-35	DIODE MA141WK	
D302		8-719-404-46	DIODE MA110	
D303		8-719-420-14	DIODE MA8082-M	
D304		8-719-404-46	DIODE MA110	
D305		8-719-404-46	DIODE MA110	
D306		8-719-420-14	DIODE MA8082-M	
D307		8-719-420-14	DIODE MA8082-M	
D308		8-719-420-14	DIODE MA8082-M	
D309		8-719-420-14	DIODE MA8082-M	
D601	⚠·	8-719-421-27	DIODE MA728	
			< FILTER >	
FL151		1-409-475-21	FILTER, TRAP	
FL301		1-415-818-11	DELAY LINE, LC (Y)	
			< IC >	
IC001		8-752-033-00	IC CXA1234AR	
IC002		8-752-033-00	IC CXA1234AR	
IC151		8-759-998-32	IC CXD-2107M	

Ref. No.		Part No.	Description	Remark
IC152		8-759-925-60	IC BA401	
IC153		8-759-509-05	IC XRU4066BF	
IC301		8-759-038-83	IC MC13400FUEB	
IC302		8-759-521-09	IC MB88346APFV	
IC601		8-752-833-59	IC CXP80624-245Q	
IC602		8-759-044-07	IC uPD75304GF-210-3B9	
IC603		8-759-512-42	IC CXA1481R	
IC604		8-759-823-90	IC LB8110M	
IC605		8-759-823-65	IC MCD002AM	
IC606		8-759-057-60	IC MCD004BM	
IC607		8-759-038-98	IC MPC1726MR2	
IC608	⚠·	8-759-511-22	IC CXA1448N	
IC609		8-759-999-02	IC TL1596CDB	
IC610		8-759-512-69	IC S-81350HG-KD	
IC611		8-759-243-19	IC TC7SU04F	
			< COIL >	
L001		1-412-033-11	INDUCTOR CHIP 220uH	
L002		1-410-385-11	INDUCTOR CHIP 22uH	
L003		1-410-383-31	INDUCTOR CHIP 15uH	
L004		1-412-032-11	INDUCTOR CHIP 100uH	
L005		1-412-032-11	INDUCTOR CHIP 100uH	
L006		1-410-384-31	INDUCTOR CHIP 18uH	
L007		1-412-033-11	INDUCTOR CHIP 220uH	
L008		1-410-385-11	INDUCTOR CHIP 22uH	
L009		1-410-384-31	INDUCTOR CHIP 18uH	
L010		1-412-032-11	INDUCTOR CHIP 100uH	
L011		1-410-384-31	INDUCTOR CHIP 18uH	
L012		1-410-381-11	INDUCTOR CHIP 10uH	
L013		1-410-381-11	INDUCTOR CHIP 10uH	
L014		1-412-033-11	INDUCTOR CHIP 220uH	
L015		1-410-381-11	INDUCTOR CHIP 10uH	
L016		1-412-032-11	INDUCTOR CHIP 100uH	
L151		1-410-381-11	INDUCTOR CHIP 10uH	
L152		1-410-657-21	INDUCTOR CHIP 180uH	
L153		1-408-797-11	INDUCTOR CHIP 470uH	
L154		1-410-388-21	INDUCTOR CHIP 39uH	
L155		1-410-382-31	INDUCTOR CHIP 12uH	
L156		1-410-381-11	INDUCTOR CHIP 10uH	
L157		1-410-381-11	INDUCTOR CHIP 10uH	
L158		1-410-657-21	INDUCTOR CHIP 180uH	
L159		1-410-387-11	INDUCTOR CHIP 33uH	
L160		1-410-381-11	INDUCTOR CHIP 10uH	
L161		1-410-384-31	INDUCTOR CHIP 18uH	
L162		1-408-797-11	INDUCTOR CHIP 470uH	
L163		1-408-797-11	INDUCTOR CHIP 470uH	
L164		1-410-384-31	INDUCTOR CHIP 18uH	
L165		1-412-280-31	INDUCTOR 330uH	

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description		Remark
L166	1-410-658-31	INDUCTOR CHIP	220uH	
L167	1-410-656-11	INDUCTOR CHIP	150uH	
L168	1-410-655-31	INDUCTOR CHIP	120uH	
L169	1-410-381-11	INDUCTOR CHIP	10uH	
L170	1-410-381-11	INDUCTOR CHIP	10uH	
L171	1-412-280-31	INDUCTOR	330uH	
L172	1-410-379-31	INDUCTOR CHIP	6.8uH	
L301	1-412-029-11	INDUCTOR CHIP	10uH	
L302	1-412-029-11	INDUCTOR CHIP	10uH	
L303	1-410-389-31	INDUCTOR CHIP	47uH	
L304	1-410-369-11	INDUCTOR CHIP	1uH	
L306	1-412-029-11	INDUCTOR CHIP	10uH	
L601	1-412-031-11	INDUCTOR CHIP	47uH	
L602	1-410-369-11	INDUCTOR CHIP	1uH	
L603	1-412-032-11	INDUCTOR CHIP	100uH	
L604	1-412-280-31	INDUCTOR	330uH	
L605	1-410-389-31	INDUCTOR CHIP	47uH	
L606	1-412-031-11	INDUCTOR CHIP	47uH	

< IC LINK >

Ref. No.	Part No.	Description		Remark
PS601⚠·	1-532-605-00	LINK, IC ICP-F10	(0.4A)	
PS602⚠·	1-532-685-00	LINK, IC ICP-F20	(0.8A)	

< TRANSISTOR >

Ref. No.	Part No.	Description		Remark
Q001	8-729-140-63	TRANSISTOR	2SA1611-M5M6	
Q002	8-729-423-52	TRANSISTOR	2SC3931	
Q003	8-729-905-18	TRANSISTOR	DTC144EU	
Q004	8-729-824-02	TRANSISTOR	2SA1838	
Q005	8-729-824-02	TRANSISTOR	2SA1838	
Q006	8-729-423-52	TRANSISTOR	2SC3931	
Q007	8-729-905-18	TRANSISTOR	DTC144EU	
Q008	8-729-140-63	TRANSISTOR	2SA1611-M5M6	
Q009	8-729-905-18	TRANSISTOR	DTC144EU	
Q010	8-729-140-63	TRANSISTOR	2SA1611-M5M6	
Q011	8-729-423-52	TRANSISTOR	2SC3931	
Q012	8-729-905-18	TRANSISTOR	DTC144EU	
Q013	8-729-824-02	TRANSISTOR	2SA1838	
Q014	8-729-824-02	TRANSISTOR	2SA1838	
Q015	8-729-423-52	TRANSISTOR	2SC3931	
Q016	8-729-905-18	TRANSISTOR	DTC144EU	
Q017	8-729-140-63	TRANSISTOR	2SA1611-M5M6	
Q018	8-729-905-18	TRANSISTOR	DTC144EU	
Q019	8-729-140-63	TRANSISTOR	2SA1611-M5M6	
Q020	8-729-140-63	TRANSISTOR	2SA1611-M5M6	
Q021	8-729-216-22	TRANSISTOR	2SA1162	
Q151	8-729-423-52	TRANSISTOR	2SC3931	
Q152	8-729-905-35	TRANSISTOR	2SC4081-R	
Q153	8-729-905-35	TRANSISTOR	2SC4081-R	
Q154	8-729-423-52	TRANSISTOR	2SC3931	

Ref. No.	Part No.	Description		Remark
Q155	8-729-140-63	TRANSISTOR	2SA1611-M5M6	
Q157	8-729-905-18	TRANSISTOR	DTC144EU	
Q158	8-729-905-35	TRANSISTOR	2SC4081-R	
Q159	8-729-905-18	TRANSISTOR	DTC144EU	
Q160	8-729-904-20	TRANSISTOR	FMA2	
Q161	8-729-904-07	TRANSISTOR	FMG2	
Q162	8-729-904-20	TRANSISTOR	FMA2	
Q163	8-729-904-07	TRANSISTOR	FMG2	
Q165	8-729-823-16	TRANSISTOR	2SC4555-5.6.7	
Q166	8-729-905-18	TRANSISTOR	DTC144EU	
Q167	8-729-905-35	TRANSISTOR	2SC4081-R	
Q168	8-729-423-52	TRANSISTOR	2SC3931	
Q169	8-729-905-12	TRANSISTOR	DTA144EU	
Q170	8-729-905-35	TRANSISTOR	2SC4081-R	
Q171	8-729-905-18	TRANSISTOR	DTC144EU	
Q172	8-729-905-18	TRANSISTOR	DTC144EU	
Q173	8-729-905-18	TRANSISTOR	DTC144EU	
Q174	8-729-905-35	TRANSISTOR	2SC4081-R	
Q175	8-729-905-35	TRANSISTOR	2SC4081-R	
Q176	8-729-602-21	TRANSISTOR	2SC4154	
Q176	8-729-905-35	TRANSISTOR	2SC4081-R	
Q177	8-729-903-10	TRANSISTOR	FMW1	
Q178	8-729-140-63	TRANSISTOR	2SA1611-M5M6	
Q179	8-729-905-18	TRANSISTOR	DTC144EU	
Q180	8-729-140-63	TRANSISTOR	2SA1611-M5M6	
Q181	8-729-140-63	TRANSISTOR	2SA1611-M5M6	
Q182	8-729-905-18	TRANSISTOR	DTC144EU	
Q183	8-729-905-35	TRANSISTOR	2SC4081-R	
Q186	8-729-905-35	TRANSISTOR	2SC4081-R	
Q187	8-729-905-18	TRANSISTOR	DTC144EU	
Q189	8-729-903-10	TRANSISTOR	FMW1	
Q192	8-729-905-18	TRANSISTOR	DTC144EU	
Q193	8-729-904-20	TRANSISTOR	FMA2	
Q194	8-729-905-12	TRANSISTOR	DTA144EU	
Q195	8-729-905-35	TRANSISTOR	2SC4081-R	
Q196	8-729-905-18	TRANSISTOR	DTC144EU	
Q197	8-729-905-35	TRANSISTOR	2SC4081-R	
Q198	8-729-140-63	TRANSISTOR	2SA1611-M5M6	
Q199	8-729-905-18	TRANSISTOR	DTC144EU	
Q200	8-729-905-18	TRANSISTOR	DTC144EU	
Q201	8-729-905-35	TRANSISTOR	2SC4081-R	
Q202	8-729-905-35	TRANSISTOR	2SC4081-R	
Q301	8-729-905-96	TRANSISTOR	DTA114TU	
Q302	8-729-905-18	TRANSISTOR	DTC144EU	
Q303	8-729-904-07	TRANSISTOR	FMG2	
Q304	8-729-423-52	TRANSISTOR	2SC3931	
Q305	8-729-421-23	TRANSISTOR	XN1216	
Q306	8-729-423-52	TRANSISTOR	2SC3931	
Q307	8-729-402-78	TRANSISTOR	XN6401	

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
Q308	8-729-824-05	TRANSISTOR 3SK248	
Q309	8-729-824-05	TRANSISTOR 3SK248	
Q310	8-729-905-35	TRANSISTOR 2SC4081-R	
Q311	8-729-921-58	TRANSISTOR DTA144TU	
Q312	8-729-905-18	TRANSISTOR DTC144EU	
Q313	8-729-402-78	TRANSISTOR XN6401	
Q314	8-729-106-60	TRANSISTOR 2SB1115A	
Q315	8-729-905-23	TRANSISTOR 2SA1576-R	
Q318	8-729-905-35	TRANSISTOR 2SC4081-R	
Q601	8-729-907-00	TRANSISTOR DTC114EU	
		< RESISTOR >	
R001	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R002	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R003	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R004	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R005	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R008	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R009	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R010	1-216-812-11	METAL CHIP 180 5% 1/16W	
R011	1-216-797-11	METAL CHIP 10 5% 1/16W	
R012	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R013	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R014	1-216-838-11	METAL CHIP 27K 5% 1/16W	
R015	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
R016	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R017	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R019	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R020	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R021	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R022	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R023	1-216-840-11	METAL CHIP 39K 5% 1/16W	
R024	1-216-840-11	METAL CHIP 39K 5% 1/16W	
R025	1-216-840-11	METAL CHIP 39K 5% 1/16W	
R026	1-216-840-11	METAL CHIP 39K 5% 1/16W	
R027	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R028	1-216-838-11	METAL CHIP 27K 5% 1/16W	
R029	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R030	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R031	1-216-812-11	METAL CHIP 180 5% 1/16W	
R032	1-216-797-11	METAL CHIP 10 5% 1/16W	
R033	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R034	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R035	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R036	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R037	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R039	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R040	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R041	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	

Ref. No.	Part No.	Description	Remark
R042	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R043	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R044	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R045	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R046	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R047	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R050	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R051	1-216-797-11	METAL CHIP 10 5% 1/16W	
R052	1-216-812-11	METAL CHIP 180 5% 1/16W	
R053	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R054	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R055	1-216-838-11	METAL CHIP 27K 5% 1/16W	
R056	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R057	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R058	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R060	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R061	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R062	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R063	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R064	1-216-840-11	METAL CHIP 39K 5% 1/16W	
R065	1-216-840-11	METAL CHIP 39K 5% 1/16W	
R066	1-216-840-11	METAL CHIP 39K 5% 1/16W	
R067	1-216-840-11	METAL CHIP 39K 5% 1/16W	
R068	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R069	1-216-838-11	METAL CHIP 27K 5% 1/16W	
R070	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R071	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R072	1-216-797-11	METAL CHIP 10 5% 1/16W	
R073	1-216-812-11	METAL CHIP 180 5% 1/16W	
R074	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R075	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R076	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R077	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R078	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R080	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R081	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R082	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R089	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R090	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R091	1-216-814-11	METAL CHIP 270 5% 1/16W	
R092	1-216-813-11	METAL CHIP 220 5% 1/16W	
R093	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R094	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R095	1-216-805-11	METAL CHIP 47 5% 1/16W	
R096	1-216-805-11	METAL CHIP 47 5% 1/16W	
R097	1-216-818-11	METAL CHIP 560 5% 1/16W	
R098	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R099	1-216-841-11	METAL CHIP 47K 5% 1/16W	

Ref. No.	Part No.	Description			Remark
R100	1-216-828-11	METAL CHIP	3.9K	5%	1/16W
R151	1-216-839-11	METAL CHIP	33K	5%	1/16W
R152	1-216-818-11	METAL CHIP	560	5%	1/16W
R153	1-216-835-11	METAL CHIP	15K	5%	1/16W
R154	1-216-816-11	METAL CHIP	390	5%	1/16W
R155	1-216-819-11	METAL CHIP	680	5%	1/16W
R156	1-216-837-11	METAL CHIP	22K	5%	1/16W
R157	1-216-837-11	METAL CHIP	22K	5%	1/16W
R158	1-216-813-11	METAL CHIP	220	5%	1/16W
R159	1-216-818-11	METAL CHIP	560	5%	1/16W
R160	1-216-821-11	METAL CHIP	1K	5%	1/16W
R161	1-216-820-11	METAL CHIP	820	5%	1/16W
R162	1-216-817-11	METAL CHIP	470	5%	1/16W
R163	1-216-817-11	METAL CHIP	470	5%	1/16W
R164	1-216-821-11	METAL CHIP	1K	5%	1/16W
R165	1-216-821-11	METAL CHIP	1K	5%	1/16W
R166	1-216-821-11	METAL CHIP	1K	5%	1/16W
R167	1-216-815-11	METAL CHIP	330	5%	1/16W
R168	1-216-841-11	METAL CHIP	47K	5%	1/16W
R169	1-216-828-11	METAL CHIP	3.9K	5%	1/16W
R170	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R171	1-216-820-11	METAL CHIP	820	5%	1/16W
R172	1-216-811-11	METAL CHIP	150	5%	1/16W
R173	1-216-833-11	METAL CHIP	10K	5%	1/16W
R174	1-216-833-11	METAL CHIP	10K	5%	1/16W
R175	1-216-833-11	METAL CHIP	10K	5%	1/16W
R176	1-216-821-11	METAL CHIP	1K	5%	1/16W
R177	1-216-837-11	METAL CHIP	22K	5%	1/16W
R178	1-216-837-11	METAL CHIP	22K	5%	1/16W
R179	1-216-809-11	METAL CHIP	100	5%	1/16W
R180	1-216-813-11	METAL CHIP	220	5%	1/16W
R181	1-216-835-11	METAL CHIP	15K	5%	1/16W
R182	1-216-817-11	METAL CHIP	470	5%	1/16W
R184	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R185	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R186	1-216-822-11	METAL CHIP	1.2K	5%	1/16W
R187	1-216-837-11	METAL CHIP	22K	5%	1/16W
R188	1-216-837-11	METAL CHIP	22K	5%	1/16W
R189	1-216-818-11	METAL CHIP	560	5%	1/16W
R190	1-216-815-11	METAL CHIP	330	5%	1/16W
R191	1-216-820-11	METAL CHIP	820	5%	1/16W
R192	1-216-837-11	METAL CHIP	22K	5%	1/16W
R193	1-216-837-11	METAL CHIP	22K	5%	1/16W
R194	1-216-821-11	METAL CHIP	1K	5%	1/16W
R195	1-216-838-11	METAL CHIP	27K	5%	1/16W
R196	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R197	1-216-816-11	METAL CHIP	390	5%	1/16W
R198	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R199	1-216-829-11	METAL CHIP	4.7K	5%	1/16W

Ref. No.	Part No.	Description			Remark
R200	1-216-864-11	METAL CHIP	0	5%	1/16W
R201	1-216-826-11	METAL CHIP	2.7K	5%	1/16W
R202	1-216-839-11	METAL CHIP	33K	5%	1/16W
R203	1-216-837-11	METAL CHIP	22K	5%	1/16W
R204	1-216-815-11	METAL CHIP	330	5%	1/16W
R205	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R206	1-216-817-11	METAL CHIP	470	5%	1/16W
R207	1-216-808-11	METAL CHIP	82	5%	1/16W
R208	1-216-823-11	METAL CHIP	1.5K	5%	1/16W
R209	1-216-824-11	METAL CHIP	1.8K	5%	1/16W
R210	1-216-830-11	METAL CHIP	5.6K	5%	1/16W
R211	1-216-822-11	METAL CHIP	1.2K	5%	1/16W
R212	1-216-824-11	METAL CHIP	1.8K	5%	1/16W
R213	1-216-824-11	METAL CHIP	1.8K	5%	1/16W
R214	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R215	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R216	1-216-864-11	METAL CHIP	0	5%	1/16W
R217	1-216-824-11	METAL CHIP	1.8K	5%	1/16W
R218	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R220	1-216-864-11	METAL CHIP	0	5%	1/16W
R221	1-216-833-11	METAL CHIP	10K	5%	1/16W
R222	1-216-833-11	METAL CHIP	10K	5%	1/16W
R223	1-216-833-11	METAL CHIP	10K	5%	1/16W
R224	1-216-837-11	METAL CHIP	22K	5%	1/16W
R225	1-216-814-11	METAL CHIP	270	5%	1/16W
R226	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R227	1-216-817-11	METAL CHIP	470	5%	1/16W
R229	1-216-813-11	METAL CHIP	220	5%	1/16W
R230	1-216-815-11	METAL CHIP	330	5%	1/16W
R231	1-216-833-11	METAL CHIP	10K	5%	1/16W
R232	1-216-833-11	METAL CHIP	10K	5%	1/16W
R233	1-216-816-11	METAL CHIP	390	5%	1/16W
R234	1-216-808-11	METAL CHIP	82	5%	1/16W
R235	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R236	1-216-837-11	METAL CHIP	22K	5%	1/16W
R237	1-216-837-11	METAL CHIP	22K	5%	1/16W
R239	1-216-838-11	METAL CHIP	27K	5%	1/16W
R240	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R241	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R243	1-216-818-11	METAL CHIP	560	5%	1/16W
R244	1-216-817-11	METAL CHIP	470	5%	1/16W
R245	1-216-837-11	METAL CHIP	22K	5%	1/16W
R246	1-216-833-11	METAL CHIP	10K	5%	1/16W
R247	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R248	1-216-823-11	METAL CHIP	1.5K	5%	1/16W
R249	1-216-821-11	METAL CHIP	1K	5%	1/16W
R250	1-216-828-11	METAL CHIP	3.9K	5%	1/16W
R251	1-216-835-11	METAL CHIP	15K	5%	1/16W
R252	1-216-833-11	METAL CHIP	10K	5%	1/16W

Ref. No.	Part No.	Description			Remark
R253	1-216-820-11	METAL CHIP	820	5%	1/16W
R254	1-216-820-11	METAL CHIP	820	5%	1/16W
R255	1-216-819-11	METAL CHIP	680	5%	1/16W
R256	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R257	1-216-835-11	METAL CHIP	15K	5%	1/16W
R258	1-216-821-11	METAL CHIP	1K	5%	1/16W
R259	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R260	1-216-833-11	METAL CHIP	10K	5%	1/16W
R261	1-216-839-11	METAL CHIP	33K	5%	1/16W
R262	1-216-839-11	METAL CHIP	33K	5%	1/16W
R265	1-216-815-11	METAL CHIP	330	5%	1/16W
R267	1-216-837-11	METAL CHIP	22K	5%	1/16W
R268	1-216-837-11	METAL CHIP	22K	5%	1/16W
R269	1-216-839-11	METAL CHIP	33K	5%	1/16W
R270	1-216-837-11	METAL CHIP	22K	5%	1/16W
R271	1-216-837-11	METAL CHIP	22K	5%	1/16W
R272	1-216-839-11	METAL CHIP	33K	5%	1/16W
R273	1-216-837-11	METAL CHIP	22K	5%	1/16W
R274	1-216-837-11	METAL CHIP	22K	5%	1/16W
R275	1-216-839-11	METAL CHIP	33K	5%	1/16W
R276	1-216-817-11	METAL CHIP	470	5%	1/16W
R277	1-216-826-11	METAL CHIP	2.7K	5%	1/16W
R278	1-216-832-11	METAL CHIP	8.2K	5%	1/16W
R279	1-216-833-11	METAL CHIP	10K	5%	1/16W
R280	1-216-817-11	METAL CHIP	470	5%	1/16W
R281	1-216-817-11	METAL CHIP	470	5%	1/16W
R301	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R302	1-216-839-11	METAL CHIP	33K	5%	1/16W
R303	1-216-839-11	METAL CHIP	33K	5%	1/16W
R304	1-216-821-11	METAL CHIP	1K	5%	1/16W
R305	1-216-821-11	METAL CHIP	1K	5%	1/16W
R306	1-216-828-11	METAL CHIP	3.9K	5%	1/16W
R307	1-216-823-11	METAL CHIP	1.5K	5%	1/16W
R308	1-216-833-11	METAL CHIP	10K	5%	1/16W
R309	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R310	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R311	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R312	1-216-821-11	METAL CHIP	1K	5%	1/16W
R313	1-216-821-11	METAL CHIP	1K	5%	1/16W
R314	1-216-817-11	METAL CHIP	470	5%	1/16W
R315	1-216-826-11	METAL CHIP	2.7K	5%	1/16W
R316	1-216-821-11	METAL CHIP	1K	5%	1/16W
R317	1-216-820-11	METAL CHIP	820	5%	1/16W
R318	1-216-803-11	METAL CHIP	33	5%	1/16W
R319	1-216-804-11	METAL CHIP	39	5%	1/16W
R320	1-216-845-11	METAL CHIP	100K	5%	1/16W
R321	1-216-803-11	METAL CHIP	33	5%	1/16W
R322	1-216-804-11	METAL CHIP	39	5%	1/16W
R323	1-216-845-11	METAL CHIP	100K	5%	1/16W
R324	1-216-857-11	METAL CHIP	1M	5%	1/16W
R325	1-216-857-11	METAL CHIP	1M	5%	1/16W
R326	1-216-847-11	METAL CHIP	150K	5%	1/16W
R327	1-216-845-11	METAL CHIP	100K	5%	1/16W
R328	1-216-833-11	METAL CHIP	10K	5%	1/16W
R329	1-216-821-11	METAL CHIP	1K	5%	1/16W
R330	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R331	1-216-791-11	METAL CHIP	3.3	5%	1/16W
R332	1-216-822-11	METAL CHIP	1.2K	5%	1/16W
R333	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R334	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R335	1-216-853-11	METAL CHIP	470K	5%	1/16W
R336	1-216-853-11	METAL CHIP	470K	5%	1/16W
R337	1-216-841-11	METAL CHIP	47K	5%	1/16W
R338	1-216-817-11	METAL CHIP	470	5%	1/16W
R339	1-216-821-11	METAL CHIP	1K	5%	1/16W
R340	1-216-820-11	METAL CHIP	820	5%	1/16W
R341	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R343	1-216-837-11	METAL CHIP	22K	5%	1/16W
R344	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R345	1-216-849-11	METAL CHIP	220K	5%	1/16W
R348	1-216-857-11	METAL CHIP	1M	5%	1/16W
R601	1-216-833-11	METAL CHIP	10K	5%	1/16W
R604	1-216-833-11	METAL CHIP	10K	5%	1/16W
R605	1-216-837-11	METAL CHIP	22K	5%	1/16W
R606	1-216-845-11	METAL CHIP	100K	5%	1/16W
R607	1-216-841-11	METAL CHIP	47K	5%	1/16W
R608	1-216-837-11	METAL CHIP	22K	5%	1/16W
R609	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R610	1-216-856-11	METAL CHIP	820K	5%	1/16W
R611	1-216-856-11	METAL CHIP	820K	5%	1/16W
R612	1-216-841-11	METAL CHIP	47K	5%	1/16W
R613	1-216-849-11	METAL CHIP	220K	5%	1/16W
R614	1-216-824-11	METAL CHIP	1.8K	5%	1/16W
R615	1-216-833-11	METAL CHIP	10K	5%	1/16W
R616	1-216-832-11	METAL CHIP	8.2K	5%	1/16W
R617	1-216-174-00	METAL GLAZE	100	5%	1/8W
R618	1-216-176-00	METAL GLAZE	120	5%	1/8W
R619	1-216-852-11	METAL CHIP	390K	5%	1/16W
R620	1-216-838-11	METAL CHIP	27K	5%	1/16W
R621	1-216-839-11	METAL CHIP	33K	5%	1/16W
R622	1-216-839-11	METAL CHIP	33K	5%	1/16W
R623	1-216-857-11	METAL CHIP	1M	5%	1/16W
R624	1-216-857-11	METAL CHIP	1M	5%	1/16W
R625	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R626	1-216-841-11	METAL CHIP	47K	5%	1/16W
R627	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R628	1-216-841-11	METAL CHIP	47K	5%	1/16W

Ref. No.	Part No.	Description			Remark
R629	1-216-687-11	METAL CHIP	33K	0.5%	1/10W
R630	1-216-653-11	METAL CHIP	1.2K	0.5%	1/10W
R632	1-216-809-11	METAL CHIP	100	5%	1/16W
R633	1-217-671-11	METAL CHIP	1	5%	1/10W
R634	1-217-671-11	METAL CHIP	1	5%	1/10W
R635	1-217-671-11	METAL CHIP	1	5%	1/10W
R636	1-217-671-11	METAL CHIP	1	5%	1/10W
R637	1-216-833-11	METAL CHIP	10K	5%	1/16W
R638	1-216-833-11	METAL CHIP	10K	5%	1/16W
R639	1-216-833-11	METAL CHIP	10K	5%	1/16W
R640	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R641	1-216-826-11	METAL CHIP	2.7K	5%	1/16W
R647	1-216-828-11	METAL CHIP	3.9K	5%	1/16W
R648	1-216-833-11	METAL CHIP	10K	5%	1/16W
R649	1-216-840-11	METAL CHIP	39K	5%	1/16W
R653	1-216-854-11	METAL CHIP	560K	5%	1/16W
R654	1-216-849-11	METAL CHIP	220K	5%	1/16W
R655	1-216-661-11	METAL CHIP	2.7K	0.5%	1/10W
R656	1-216-833-11	METAL CHIP	10K	5%	1/16W
R657	1-216-833-11	METAL CHIP	10K	5%	1/16W
R658	1-216-809-11	METAL CHIP	100	5%	1/16W
R660	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R661	1-216-841-11	METAL CHIP	47K	5%	1/16W
R662	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R663	1-216-833-11	METAL CHIP	10K	5%	1/16W
R665	1-216-841-11	METAL CHIP	47K	5%	1/16W
R666	1-216-851-11	METAL CHIP	330K	5%	1/16W
R668	1-216-833-11	METAL CHIP	10K	5%	1/16W
R669	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R670	1-216-845-11	METAL CHIP	100K	5%	1/16W
R673	1-216-841-11	METAL CHIP	47K	5%	1/16W
R674	1-216-853-11	METAL CHIP	470K	5%	1/16W
R676	1-216-833-11	METAL CHIP	10K	5%	1/16W
R677	1-216-841-11	METAL CHIP	47K	5%	1/16W
R680	1-216-845-11	METAL CHIP	100K	5%	1/16W
R681	1-216-833-11	METAL CHIP	10K	5%	1/16W
R683	1-216-821-11	METAL CHIP	1K	5%	1/16W
R684	1-216-841-11	METAL CHIP	47K	5%	1/16W
R685	1-216-821-11	METAL CHIP	1K	5%	1/16W
R687	1-216-821-11	METAL CHIP	1K	5%	1/16W
R689	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R690	1-216-841-11	METAL CHIP	47K	5%	1/16W
R691	1-216-841-11	METAL CHIP	47K	5%	1/16W
R692	1-216-841-11	METAL CHIP	47K	5%	1/16W
R693	1-216-841-11	METAL CHIP	47K	5%	1/16W
R698	1-216-861-11	METAL CHIP	2.2M	5%	1/16W
R703	1-216-821-11	METAL CHIP	1K	5%	1/16W
R704	1-216-841-11	METAL CHIP	47K	5%	1/16W
R705	1-216-817-11	METAL CHIP	470	5%	1/16W

Ref. No.	Part No.	Description			Remark
R706	1-216-841-11	METAL CHIP	47K	5%	1/16W
R707	1-216-841-11	METAL CHIP	47K	5%	1/16W
R708	1-216-864-11	METAL CHIP	0	5%	1/16W
R709	1-216-819-11	METAL CHIP	680	5%	1/16W
R712	1-216-864-11	METAL CHIP	0	5%	1/16W
R717	1-216-864-11	METAL CHIP	0	5%	1/16W
R718	1-216-821-11	METAL CHIP	1K	5%	1/16W
R719	1-216-821-11	METAL CHIP	1K	5%	1/16W
R720	1-216-853-11	METAL CHIP	470K	5%	1/16W
R721	1-216-821-11	METAL CHIP	1K	5%	1/16W

< NETWORK RESISTOR >

Ref. No.	Part No.	Description
RB601	1-236-412-11	NETWORK, RES 1.0K
RB602	1-236-412-11	NETWORK, RES 1.0K
RB603	1-236-424-11	NETWORK, RES 10K
RB604	1-236-412-11	NETWORK, RES 1.0K
RB605	1-236-440-11	NETWORK, RES 220K
RB606	1-236-408-11	NETWORK, RES 470
RB607	1-236-444-11	NETWORK, RES 470K
RB610	1-236-432-11	NETWORK, RES 47K
RB611	1-236-412-11	NETWORK, RES 1.0K
RB612	1-236-412-11	NETWORK, RES 1.0K
RB613	1-236-412-11	NETWORK, RES 1.0K
RB616	1-236-412-11	NETWORK, RES 1.0K
RB617	1-236-412-11	NETWORK, RES 1.0K
RB618	1-236-432-11	NETWORK, RES 47K
RB619	1-236-436-11	NETWORK, RES 100K
RB620	1-236-444-11	NETWORK, RES 470K
RB621	1-236-432-11	NETWORK, RES 47K
RB624	1-236-424-11	NETWORK, RES 10K
RB625	1-236-424-11	NETWORK, RES 10K
RB626	1-236-424-11	NETWORK, RES 10K
RB632	1-236-412-11	NETWORK, RES 1.0K
RB633	1-236-412-11	NETWORK, RES 1.0K
RB634	1-236-412-11	NETWORK, RES 1.0K
RB635	1-236-412-11	NETWORK, RES 1.0K
RB636	1-236-412-11	NETWORK, RES 1.0K
RB637	1-236-432-11	NETWORK, RES 47K
RB638	1-236-408-11	NETWORK, RES 470
RB639	1-236-432-11	NETWORK, RES 47K
RB640	1-236-432-11	NETWORK, RES 47K
RB641	1-236-432-11	NETWORK, RES 47K

< VARIABLE RESISTOR >

Ref. No.	Part No.	Description
RV001	1-238-090-11	RES, ADJ, CERMET 10K
RV002	1-238-089-11	RES, ADJ, CERMET 4.7K
RV003	1-238-089-11	RES, ADJ, CERMET 4.7K
RV004	1-238-089-11	RES, ADJ, CERMET 4.7K
RV301	1-238-088-11	RES, ADJ, CERMET 2.2K

< FLEXIBLE BOARD >

Ref. No.	Part No.	Description	Remark
W607	1-639-617-11	FP-382 FLEXIBLE BOARD	
W608	1-639-616-11	FP-381 FLEXIBLE BOARD	

< VIBRATOR >

Ref. No.	Part No.	Description	Remark
X601	1-579-367-21	VIBRATOR, CRYSTAL (11.9MHz)	
X602	1-578-713-21	VIBLATOR, CERAMIC (4.19MHz)	
X603	1-579-049-21	VIBRATOR, CRYSTAL (32KHz)	

* * *

MISCELLANEOUS

Ref. No.	Part No.	Description	Remark
21	1-944-055-11	HARNESS (CD-26)	
51	1-466-559-51	SWITCH BLOCK, CONTROL (FK-3)	(E.AUS)
51	1-466-605-11	SWITCH BLOCK, CONTROL (FK-3)	(AEP.UK)
53	1-466-560-41	SWITCH BLOCK, CONTROL (CF-3)	
59	1-537-370-11	TERMINAL BOARD, LB	
81	1-809-425-21	DISPLAY PANEL, LIQUID CRYSTAL	
106	1-537-373-11	JACK BOARD ASSY	
131	1-547-381-12	FILTER BLOCK, OPTICAL (OFB-02-03)	
401	1-547-494-11	LENS, ZOOM (VCL-7808XA)	
IC901	8-752-606-77	IC ICX039BNA-2 (CCD IMAGER) (Note.1)	
M901	A-7048-534-A	DRUM BLOCK ASSY (DGH-80A-R)	
M902	8-835-329-12	MOTOR, DC U-21A (CAPSTAN)	
M903	1-541-607-21	MOTOR, DC (LA12G-344VA) (LOADING)	
V901 ⚠·	1-452-565-11	CRT ASSY	

* * *

ACCESSORIES & PACKING MATERIALS

Ref. No.	Part No.	Description	Remark
	1-465-934-11	REMOTE COMMANDER (CAM CORDER) (RMT-504)	
	1-571-164-11	SWITCH, ANTENNA CHANGE (CABLE) (UK,E)	
	1-575-334-11	CORD, CONNECTION (VIDEO/AUDIO)	
	* 1-575-335-21	CORD, CONNECTION (S VIDEO)	
	* 3-704-281-01	BAG, PROTECTION (STANDARD)	
	3-712-673-01	SCREWDRIVER (UK,E)	
	3-753-410-41	MANUAL, INSTRUCTION (ENGLISH) (AEP,UK)	
	3-753-410-51	MANUAL, INSTRUCTION (AEP) (FRENCH, DUTCH, SPANISH)	
	3-753-410-61	MANUAL, INSTRUCTION (AEP) (DUTCH, SWEDISH, ITALIAN)	
	3-753-411-11	MANUAL, INSTRUCTION (ENGLISH)	
	3-753-411-51	MANUAL, INSTRUCTION (AEP,E) (FRENCH, DUTCH, SPANISH)	
	3-753-411-61	MANUAL, INSTRUCTION (AEP) (DUTCH, SWEDISH, ITALIAN)	
	3-753-411-71	MANUAL, INSTRUCTION (ARABIC) (E)	
	3-753-952-61	MANUAL, INSTRUCTION (ENGLISH) (E,AUS)	
	3-753-952-71	MANUAL, INSTRUCTION (E) (FRENCH, DUTCH, ENGLISH)	
	3-753-952-81	MANUAL, INSTRUCTION (ARABIC) (E)	
	3-753-952-91	MANUAL, INSTRUCTION (CHINESE) (E)	
	3-754-229-11	INSTRUCTION, LP MODE CAUTION	
	* 3-754-318-01	INSTRUCTION (AEP,E)	
	3-941-737-01	BELT, SHOULDER	
	* 3-943-154-01	HOLDER, REMOTE CONTROL	
	* 3-944-218-11	INDIVIDUAL CARTON	
	* 3-944-229-01	CUSHION (UPPER)	
	* 3-944-230-01	CUSHION (LOWER)	

* * *

HARDWARE LIST

Ref. No.	Part No.	Description
#1	7-621-281-15	SCREW +P 2X2
#2	7-624-102-04	STOP RING 1.5, TYPE -E

* * *

Note 1

For replacement of CCD imager, CD-74 board, complete and DT-77 board, complete read carefully the CAUTIONS FOR REPLACEMENT OF CCD IMAGER on page 88.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

SECTION 7
SERVICE MODE

☆This unit adopts the camera adjustment and the EVR (Electronic Variable resistor) with the SENSER LANC system.

7-1. SENSER LANC

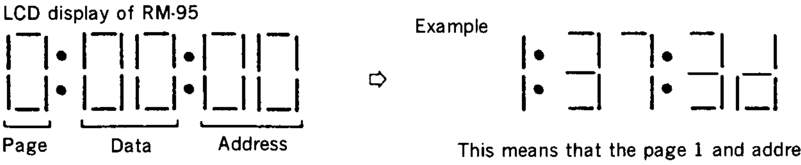
SENSER LANC is the LANC format to adjust the EVR (Electronic Variable resistor) of Video 8 Handycam and to perform tests by using the LANC (control L). This word stands for the same as the SERVICE LANC formerly used, however, the unified word "SENSER LANC" will be used with this substantial functions.

7-2. HOW TO USE RM-95 JIG (REMOTE CONTROL FOR ADJUSTMENT)

RM-95 jig is used to operate the SENSER LANC. HOLD switch of this jig is remodelled for service to get the SENSER LANC mode. Replacing microcomputer in RM-95 is required for the old-model RM-95 jig, which has no page display function.

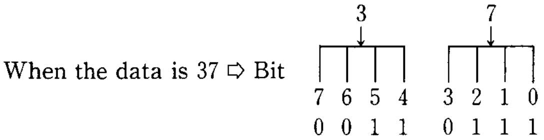
Old model	μPD7503G-A71-12 μPD7503G-C23-12	8-759-142-56 8-759-146-77	Page is not displayed (Replacing microcomputer is required)
New model	μPD7503G-C56-12	8-759-148-35	Page is displayed

LCD display of RM-95



This means that the page 1 and address 3D is data of 37.

7-3. Reference between Data and Bit

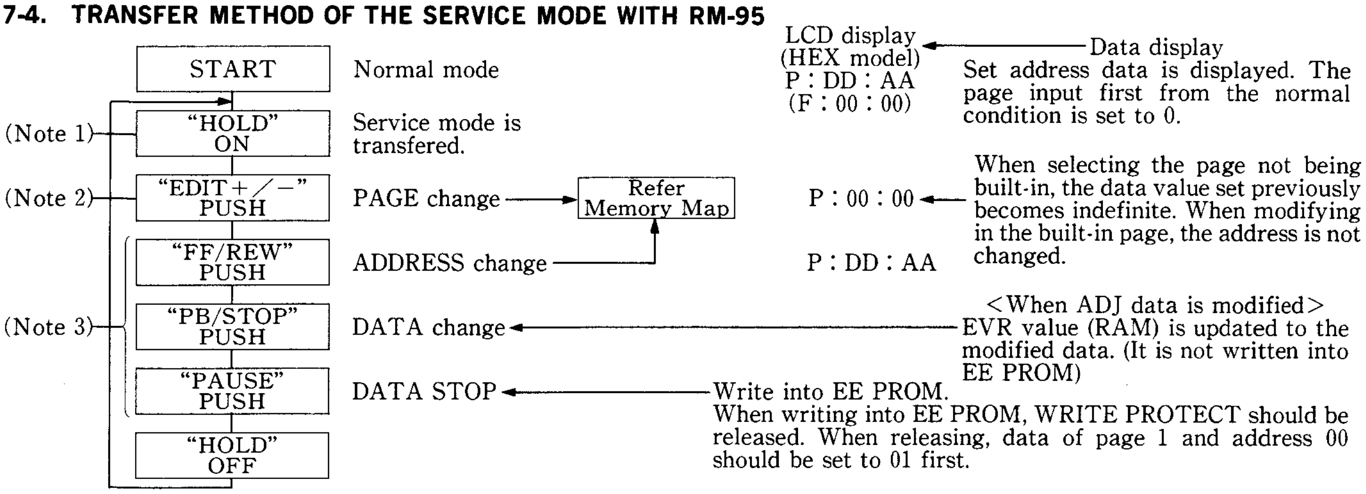


Page	Address	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	3D	MP-HG		ME/MP	REC PROOF	V MUTE	A MUTE	JOG	VA PB MODE
		0	0	1	1	0	1	1	1

The data in the above list means as follows:

ME SW ....ON
REC PROOF SW ....ON
Audio mute ....ON
JOG..................ON
VA PB MODE........ON

7-4. TRANSFER METHOD OF THE SERVICE MODE WITH RM-95


START
(Note 1)
"HOLD" ON
(Note 2)
"EDIT+/−" PUSH
"FF/REW" PUSH
(Note 3)
"PB/STOP" PUSH
"PAUSE" PUSH
"HOLD" OFF
Refer Memory Map
LCD display
(HEX model)
P : DD : AA
(F : 00 : 00)
P : 00 : 00
P : DD : AA

Normal mode

Service mode is transfered.

PAGE change

ADDRESS change

DATA change

DATA STOP

Data display
Set address data is displayed. The page input first from the normal condition is set to 0.

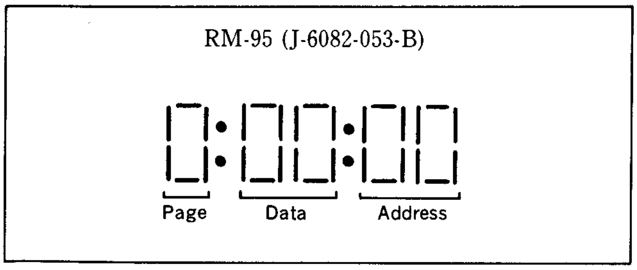
When selecting the page not being built-in, the data value set previously becomes indefinite. When modifying in the built-in page, the address is not changed.

<When ADJ data is modified>
EVR value (RAM) is updated to the modified data. (It is not written into EE PROM)

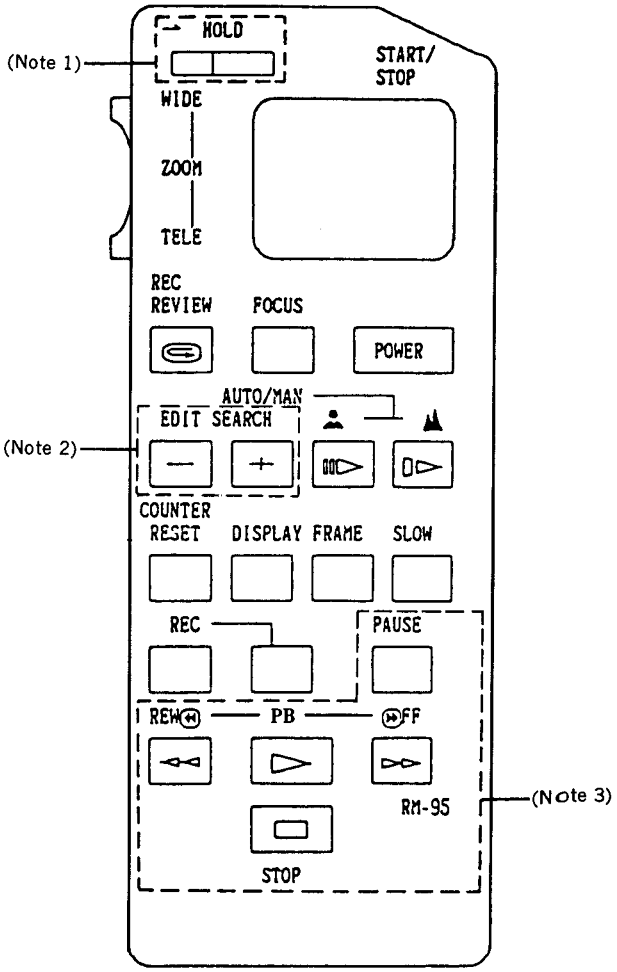
Write into EE PROM.
When writing into EE PROM, WRITE PROTECT should be released. When releasing, data of page 1 and address 00 should be set to 01 first.

Command name	Command function	Function Button with RM-95
Page Up	Page+1	Edit Search+
Page Down	Page−1	Edit Search−
Direct Page Set	Set to direct page	Event Clear
Address Up	Address+1	Fast Forward
Address Down	Address−1	Rewind
Data Up	Data+1	Play Back
Data Down	Data−1	Stop
Store	Write data into EEPROM. RAM	Pause

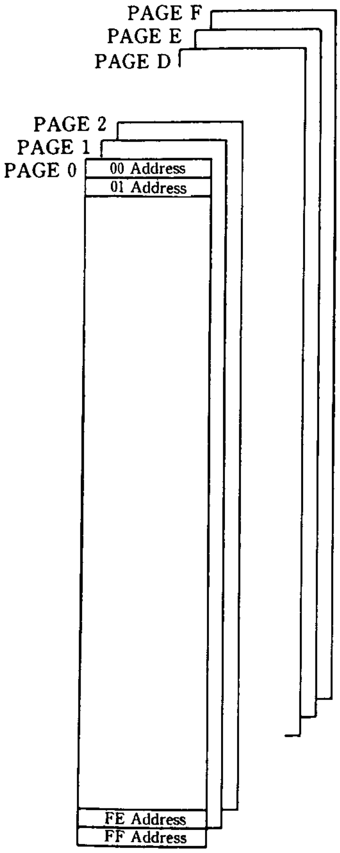
RM-95 (J-6082-053-B)


Page
Data
Address

RM-95 (J-6082-053-B)


(Note 1)
HOLD
START/STOP
WIDE
ZOOM
TELE
REC REVIEW
FOCUS
POWER
AUTO/MAN
EDIT SEARCH
(Note 2)
−
+
COUNTER RESET
DISPLAY
FRAME
SLOW
REC
PAUSE
REW
PB
FF
RM-95
(Note 3)
STOP

7-5. SENSER LANC Memory Map



This unit has pages 0 to F allocated as listed below.

PAGE	Page allocation
0	Service
1	System Control RAM and I/O
2	System Control RAM and I/O
3	System Control RAM and I/O
4	LCD microcomputer RAM and I/O
5	Camera microcomputer RAM
6	Camera microcomputer I/O
7	Spare
8	Spare
9	Spare
A	Camera DATA
B	Spare
C	Spare
D	VTR EE-PROM
E	Spare
F	Camera EE-PROM

Note: The adjustment address 00 of the first page for the RAM is a control code for total control. This address is used to enable write to EE-PROM.

The initial data for this control code is "00" which inhibits write to EE-PROM. In order to write the VTR EE-PROM and the Camera EE-PROM, the control codes for their respective adjustment pages must be set to "01 or 80" as shown by the arrows.

Sixteen different pages from 0 to F are available. Page allocations are as listed above.

Only pages D and F are allocated to such memories that will not be cleared even if the power is turned off as the EVR (electronic variable resistor).

7-6. MODES OF SELF-DIAGNOSTIC FEATURE

This unit provides the following ADJUST and TEST Modes:

MODE		Contents
ADJUST	Camera Adjustment	See Adjustment of Camera System.
	Switching Position Adjustment	See the appropriate pages.
	Battery Down Adjustment	
TEST	Pass Adjustment Track Shift	When adjusting the tape pass, this mode is selected to shift tracking.
	Emergency STOP Inhibit	This mode inhibits detection of emergency to ensure that: ○ Power will not be turned off even if battery is exhausted (at battery END). ○ Automatic discrimination between SP and LP will not be made. ○ Emergency detection will not be made except for tape TOP/END.
	Emergency Code Read	The conventional emergency display function is added with the following functions: ①Storage in EE-PROM which eliminates a lithium battery. ②Storage of information on the first and the last emergency. ③Storage of information on the mode when an emergency occurred as well as the contents of the emergency.
	Single Motor Check	This permits normal and reverse rotations and stop of each motor separately. ○ Drum motor ○ Capstan motor ○ Loading motor
	Function Switch Check	You can check whether the Function switch of the main body has been accepted or not by specifying a certain address. Also, RM-95 can be used to issue a command in place of the Function switch of the main body.
	Mechanical Switch Check	The contents of the Mechanical and Mode switches can be checked.
	Sensor Check	Input for each of the following sensors is A/D converted and this A/D converted value can be checked. (TOP sensor, END sensor, S REEL FG, T REEL FG, SWP correction thermistor, DEW sensor)
	Received Wireless Remote Control Code Check	The contents of the control code received from the wireless remote control can be checked.

7-7. HOW TO USE PRACTICALLY

How to enter the ADJUST and TEST Modes

Place RM-95 into Service mode (by turning the HOLD switch "ON").

How to change and write data

Press the PAUSE button of RM-95.
However, it is not required to press PAUSE for certain RAM and I/O areas.

Changing and writing data in and to EE-PROM

PROTECT must be removed before EE-PROM can be changed or written. To remove PROTECT, set as follows:

PAGE 5	Address 00	Data 80	(Camera system)
PAGE 0	Address 00	Data 01	(VTR system)

In this latest version, the Camera system is also protected.

How to release from each mode

Releasing from any EE-PROM area	〔Camera system〕 Be sure to return data on PAGE 5, address 00 to 00 from 80 before turning Service mode of RM-95 OFF. 〔VTR system〕 Be sure to return data on PAGE 0, address 00 to 00 from 01 before turning Service mode of RM-95 OFF.
Releasing from any RAM and I/O area	Simply turn either Service mode or power OFF because the data needs not be hold.

7-8. DESCRIPTION OF ADJUST AND TEST MODES

MODE		PAGE/DATA/ADDRESS	Contents
ADJUST	Switching Position Adjustment	D : -- : 04	This is used to adjust switching position. See page 262 for details.
	Battery Down Adjustment	0 : -- : 02 (Sensor value) D : -- : 02 (Set value)	This is used to adjust Battery Down. See page 261 for details.
TEST MODE	Pass Adjustment Track Shift	0 : 03 : 01	This is used to adjust track shift for pass adjustment. Write the data specified left and enter Playback mode.
	Emergency Inhibit	0 : 01 : 01	This inhibits detection of emergency. Power will not be turned off even if battery is exhausted (at battery END). Automatic discrimination between SP and LP will not be made. Emergency detection will be inhibited except for TOP/tape END.
	Emergency Code	D : -- : 06 D : -- : 07	This displays the first emergency. This displays the last emergency. (See * 1) (Bit 0 : REC PROOF Bit 1 : ME/$\overline{\text{MP}}$ Bit 2 : Normal/$\overline{\text{HG}}$)
	RECOG Switch Check	2 : -- : 73	This displays the mode switch position. RECOG Switch ON/OFF status display. (See * 2)
	Function Switch Check	0 : -- : 18~1B	This checks whether KEY is pressed or not. (See * 3)
	Sensor Check	0 : -- : 10 (T reel) 0 : -- : 11 (T reel)	Input for each of the following sensors is A/D converted and this A/D converted value can be checked. (S REEL FG, T REEL FG) (See * 4)
	Received Wireless Remote Control Code Check	4 : -- : Lower 4 bits of 3A and 3C	The contents of the control code received from the wireless remote control can be checked. (See * 5)

* 1 Emergency Code Check

These codes are displayed on the SENSOR LANC as follows:

(The emergency codes displayed are the first and the last emergency. The last emergency code will be rewritten when an emergency occurs; only the code which occurred first is recorded for the second emergency code.)

			First	Last	
PAGE	D	ADDRESS	06	07	← Emergency code
PAGE	D	ADDRESS	08	09	← Mode when the emergency occurred.

→ After your operation, be sure to rewrite addesses 06 through 09 to data 00.

(1) Emergency Codes List

In this unit, at the occurrence of an emergency, the code will be displayed on the SENSER LANC while it will be written to EE-PROM according to the following specifications:

〔Display area〕

Page	D	(Information is displayed at the same address of page 0.)
Address	06	Emergency Code First
	07	Emergency Code Last
	08	Emergency Mode First
	09	Emergency Mode Last

〔Emergency Code〕

Code	00	No failure.
	01	Loading motor failure.
	02	Reel failure during unloading.
	03	Other reel failure.
	04	Capstan failure.
	05	FG failure when drum was started.
	06	No PG detection when drum was started.
	07	FG failure when drum is in steady state.
	08	No PG detection when drum is in steady state.
	09	Phase lock failure when drum is in steady state.

- In order to clear the contents of 〔the first and the last emergency〕, with the SENSER LANC, write as follows:

PAGE	0	Address	00	Data	01

After this, write data 00 to each address.

Then, return to:

PAGE	0	Address	00	Data	00

(2) Mechanical Modes List

SYMBOL	CODE	Decision-making authority		Code created by the mode controller after transit is complete
		Mode controller	Mechanical controller	
MECHA INITIAL	00	×	×	
MECHA EJECTED	01	○	×	
MECHA UNLOAD	31	○	×	MECHA EJECTED
MECHA UNLOAD EMERGENCY	B1	×	○	MECHA EJECTED
MECHA LOAD	12	(○)*	×	
MECHA LOAD EMERGENCY	A2	×	○	MECHA STOP (NC)
MECHA STOP	02	○	×	
MECHA STOP NC	E2	○	×	
MECHA STOP EMERGENCY 1	B2	×	○	
MECHA STOP EMERGENCY 2	C2	×	○	
MECHA STOP TOP	72	×	○	
MECHA STOP END	62	×	○	
MECHA FF	03	○	×	
MECHA REW	83	○	×	
MECHA REC	04	○	×	
MECHA REC PAUSE	14	○	×	
MECHA REC REVFWD	85	○	×	MECHA REC PAUSE
MECHA REC REVRVS	95	○	×	MECHA REC REVFWD
MECHA EDITSFWD	A5	○	×	
MECHA EDITSRVS	B5	○	×	
MECHA PB	06	○	×	
MECHA CUE	46	○	×	
MECHA REV	56	○	×	
MECHA PB PAUSE	07	○	×	
MECHA EDIT PAUSE	F5	○	×	
MECHA F5 SLOW	27	○	×	
MECHA F29 SLOW	67	○	×	

* : This does not exit as a Final mode.

∗ 2 RECOG Switch Cheek

Check the following information displayed on the SENSOR LANC :

Page	Address	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
2	73					V MUTE	MP-HG	ME/$\overline{\text{MP}}$	REC PROOF

"1"=Normal/0 : MPHG
"1"=ME/0 : MP
"1"=REC inhibit

Page	Address	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	68	MSW C	MSW B	MSW A					

Page	Address	Bit 3
2	71	CC LOCK

"1" when cassette compartment is locked.

∗ 3 Function Switch Check (For the description of the codes, see the previous page.)

With the SENSER LANC, set as follows :

PAGE	0	Address	18～1B	Data	See the list below.

	Address 18	19	1A	1B
Data	KEY 0 (AN7)	KEY 1 (AN8)	KEY 2 (AN9)	KEY 3 (AN10)
55	STOP	PAUSE	TITLE ON/OFF	FOCUS ON /OFF
44	FF	REW	TITLE COLOR	FADER
33	ZERO MEMO	RESET	SHUTTER SPEED	BRIGHT LOCK
22	PB	EDIT (−)	WHITE BALANCE	TITLE MEMO
11	REC	EDIT (+)	—	—
00	No make	No make	No make	No make

PAGE 4	Address 20,26,28	Data See the list below.

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Address 20	TIME (defined)	DATA (defined)	AREA (defined)	SUMMER TIME (defined)	TIME	DATA	AREA	SUMMER TIME
Address 26	—	BILINGUAL SUB (defined)	BILINGUAL MAIN (defined)	EDIT (defined)	—	BILINGUAL SUB	BILINGUAL MAIN	EDIT
Address 28	AUTO LOCK (defined)	Hi8 (defined)	WIND (defined)	JACK OUT (defined)	AUTO LOCK	Hi8	WIND	JACK OUT

Note : "Defined" is flagged after chattering has been made.

* 4 To Read the A/D Converted Value (Sensor Check)

〔Operation〕
With the SENSER LANC, set as follows:

PAGE 0	Address 10~13	Data * *

Address	Converted value (contents)
10	T-REEL FG
11	S-REEL FG
12	ATF ERROR
13	BATT SENS

The current value for one step of A/D converted data is 4.9 divided by 256≒19mV.

* 5 To Check the Contents of Received Code from Wireless Remote Control

〔Operation〕
With the SENSER LANC, set as follows:

PAGE 4	Address 3A

The remote control code received will appear on the above page, address. This code will be displayed only when the LANC code is being touched. FF will be displayed when the code is released.

PAGE 4	Address 3C

The category code of the remote control code received will appear in the lower 4 bits on the above page, address. [The description of the remote control codes is omitted in this manual.]

SECTION 8
MECHANICAL ADJUSTMENTS

MECHANICAL ADJUSTMENT

As to mechanical adjustment and check and parts replacement, refer to the separate "8 mm Video Mechanical Adjustment Guide II | FL mechanism (Q mechanism) | ".
However, follow these items shown below.
The adjustment and the marks remain the same except this model has the different drum installed.

A-7049-461-A	Rotary upper drum assembly DGR-80-R-(1)
A-7049-464-A	Rotary upper drum assembly DGR-80-R-(2)

8-1. OPERATING WITH THE CASSETTE COMPARTMENT ASSEMBLY REMOVED (See Fig. 8-1.)

1. Loading

1) Remove the cabinets and camera block according to the "section 2. DISASSEMBLY" in Service Manual, and supply the power to the unit (Set up the mechanism deck so as to operate.)
2) Push into the lock plate release arm ❶ in the direction of arrow, causing the unit to be the loading state.

2. Putting into the playback state

Note : Use SENSER LANC for this adjustment.

1) Set to adjustment page 0, adjustment address 01 with adjustment remote control. Then, set TEST MODE for adjustment data 01 or 81.
(When TEST MODE is activated, the rotation sensing for S and T reel turntables and other sensing functions will be suppressed, which allows tape to run.)
2) After completing the step 1), set the power switch to VTR.
3) Put the cap ❸ on the LED assembly ❷ .
4) Push into the lock plate release arm ❶ to load.
5) Press the playback button.

3. Putting into the recording state

1) Perform the step 1) through 4) of 2. Putting into the playback state.
2) Secure the push switch ❹ with an adhesive tape ❺ .
3) Turn on the REC switch.

4. Ejecting

1) Push the EJECT button.

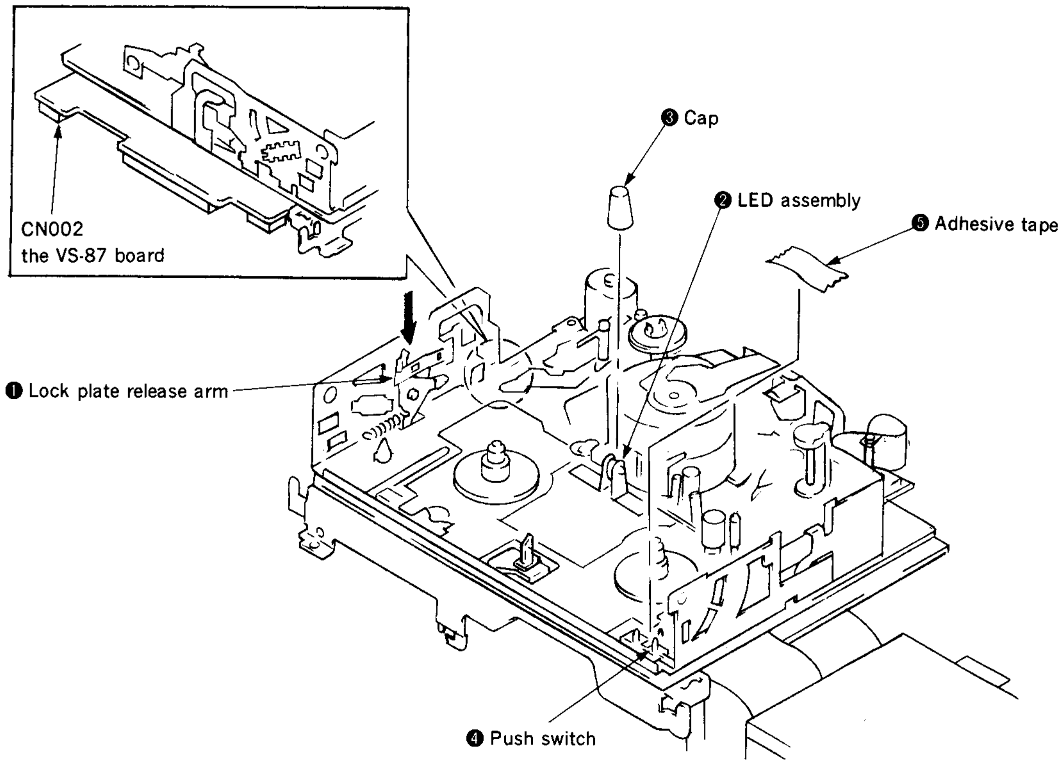


Fig. 8-1.

8-2. TAPE PATH ADJUSTMENT

1. Preparations

1) Clean the pass surface (tape guide, drum, capstan shaft and pinch roller.)
2) Short circuit Pins ④ and ⑮ of CN002 on the VS-87 board to set to PATH mode.
3) Connect to an oscilloscope.
   (Channel 1 – Pin ⑯ of CN002 on the VS-87 board
   External trigger – Pin ④ of CN002 on the VS-87 board)
4) Playback the tracking tape (WR5-1CP) (8-967-995-07).
5) Confirn that the RF waveforms at both sides of the entrance and exit on the oscilloscope are flat.
   If not, perform adjustment according to the following.

CN002 on the VS-87 board

1	$\overline{\text{EJECT SW}}$
2	LANC S10
3	CAP FG
4	$\overline{\text{PATH MODE}}$
5	REC 2B
6	REC 2A
7	REC 1B
8	REC 1A
9	$\overline{\text{1/2 RF SWP}}$
10	RF SW P
11	$\overline{\text{PB RF 2B}}$
12	$\overline{\text{PB RF 2A}}$
13	$\overline{\text{PB RF 1B}}$
14	$\overline{\text{PB RF 1A}}$
15	$\overline{\text{RF GND}}$
16	$\overline{\text{PB RF}}$

SECTION 9
CAMERA SECTION ADJUSTMENTS

See the adjusting part location diagram from on page 252 for the adjustment.

9-1. LIST OF SERVICING JIGS

- Oscilloscope
- Stabilized power supply (2 units)
- Adjusting screwdriver
- L lench
- Stop watch
- Color monitor TV
- Vectorscope
- Desk-top calculator

Ref. No.	Name	Part No.	Use
J-1	Filter (C14)	J-6080-054-A	
J-2	ND filter 0.1	J-6080-807-A	
	ND filter 0.4	J-6080-806-A	
	ND filter 1.0	J-6080-808-A	
J-3	Pattern box PTB-500	J-6029-140-A	
J-4	Color bar chart for pattern box	J-6020-250-A	
J-5	Extension cable (32P)	J-6082-142-A	To connect VC-106 board CN701 and LD-51 board CN854
	Extension cable (22P)	J-6082-106-A	To connect VC-106 board CN302 and TI-40 board CN801
	Extension cable (20P)	J-6082-133-A	To connect VS-87 board W607 and CF BLOCK CN901
	Extension cable (18P)	J-6082-141-A	To connect VC-106 board CN101 and CD-74 board CN901
J-6	Camera fixing jig	J-6080-894-A	
J-7	Siemens-star chart	J-6080-875-A	
J-8	Adjustment remote control * 1	J-6082-053-B	
J-9	AF microcomputer data reader jig * 2	J-6082-025-A	
J-10	CPA connector jig	J-6082-109-A	

* 1 Microcomputer IC in the adjustment Remote controller except for μPD7503G-C56-12 (8-759-148-35) does not allow the page selecting. Replace the microcomputer in such a case.

* 2 Change the fixed number of R1 from 10kΩ to 100kΩ in the AF microcomputer data reading jig. (If the number is kept to 10kΩ, the adjustment data can not change because of the difference of the impedance.)
When adjustment the old-model Handy Cam, 100kΩ is allowed to perform the adjustment.

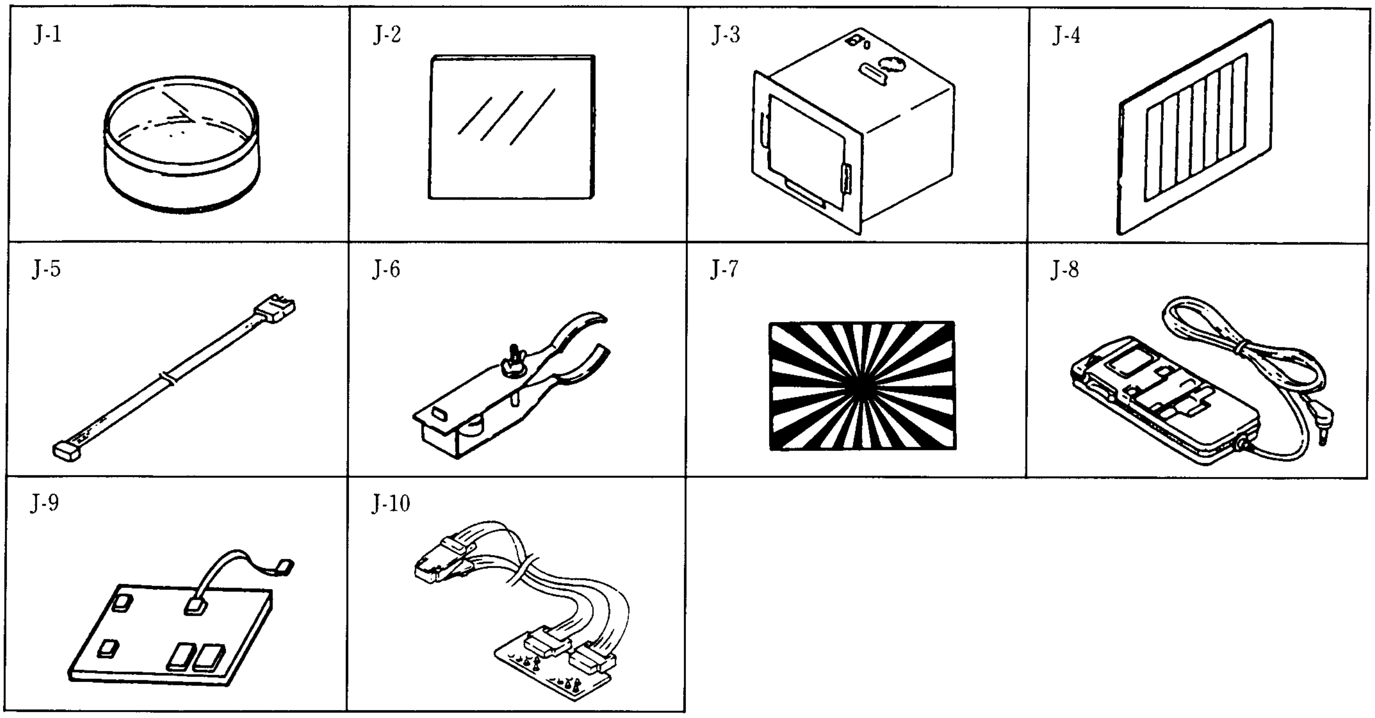

J-1
J-2
J-3
J-4
J-5
J-6
J-7
J-8
J-9
J-10

Fig. 9-1.

9-2. PREPARATION FOR ADJUSTMENT

9-2-1. Preparation

Note : Refer to the applicable service manual, "SECTION 2. DISASSEMBLY" for detailed information on the removal procedures for the cabinet and each board.

1) With the extension cables, connect between the camera block and the video block and connect other equipment as shown in Fig. 9-3.
2) EVF (Electrical View Finder) section (VF-40 board) is necessary for checking the shutter speed, white balance mode, etc.
   If not necessary, it can be removed by removing CN301 on the VS-87 board.
3) MIC board (MA-116 board) is not required. Remove it by removing CN903 on the MA-116 board.

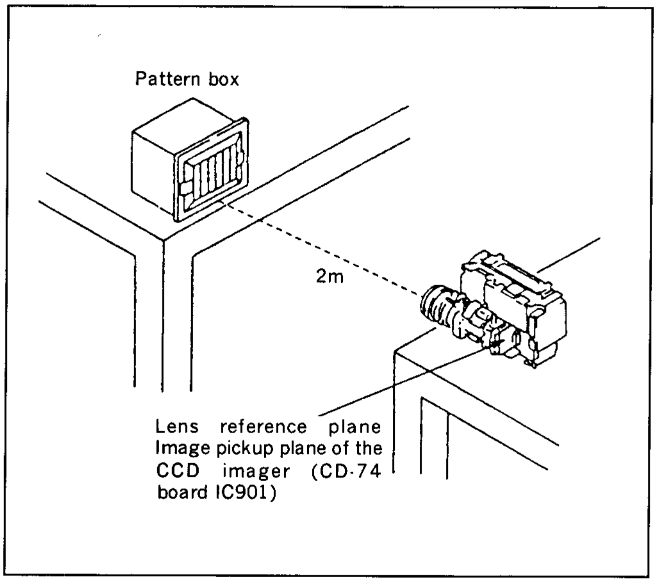

Pattern box
2m
Lens reference plane
Image pickup plane of the CCD imager (CD-74 board IC901)

Fig. 9-2.

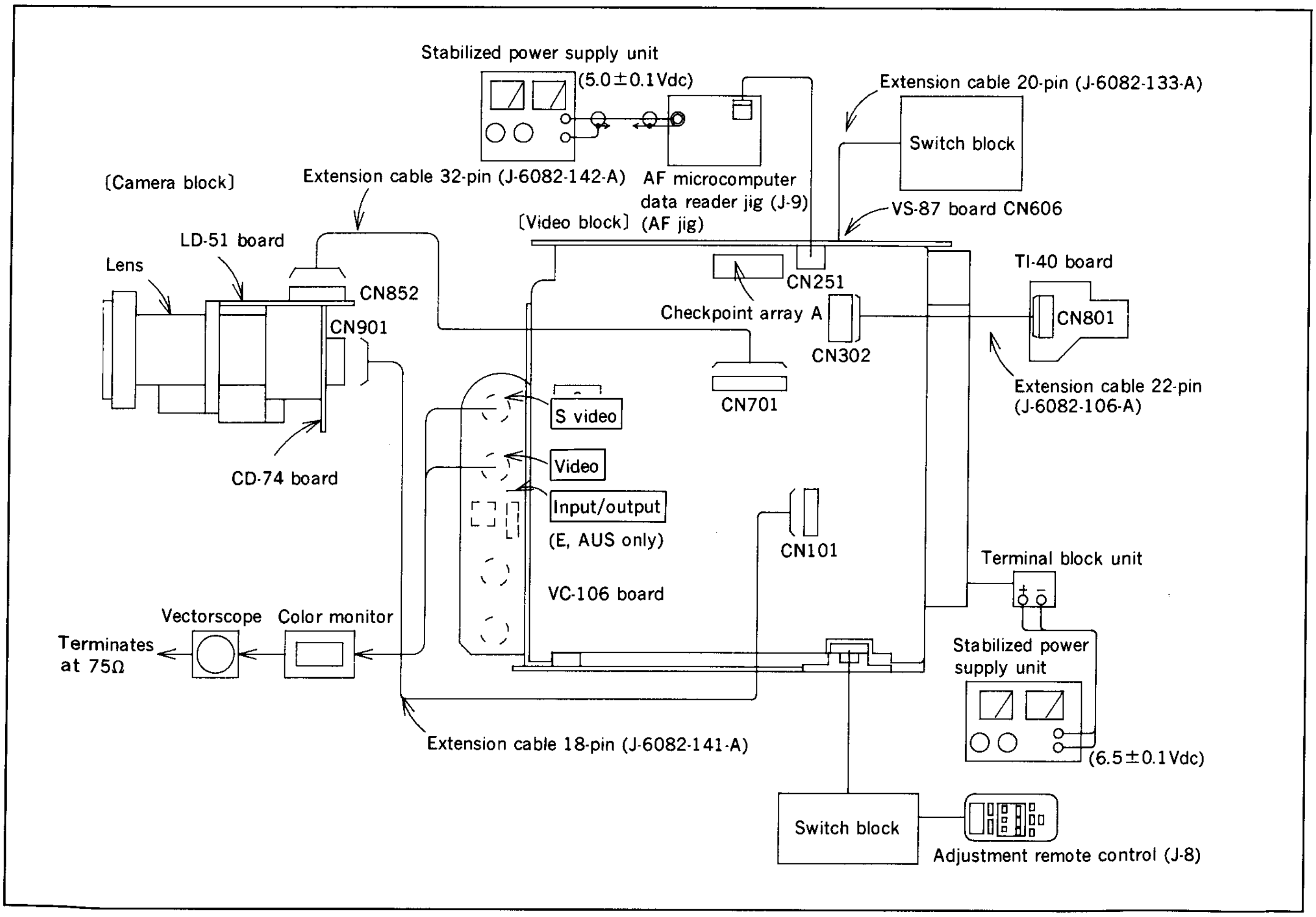

Stabilized power supply unit
(5.0±0.1Vdc)
Extension cable 20-pin (J-6082-133-A)
Switch block
[Camera block]
Extension cable 32-pin (J-6082-142-A)
AF microcomputer data reader jig (J-9) (AF jig)
[Video block]
VS-87 board CN606
LD-51 board
Lens
CN852
CN901
CN251
Checkpoint array A
CN302
TI-40 board
CN801
CN701
Extension cable 22-pin (J-6082-106-A)
S video
Video
Input/output
(E, AUS only)
CN101
CD-74 board
VC-106 board
Terminal block unit
Vectorscope
Color monitor
Terminates at 75Ω
Stabilized power supply unit
Extension cable 18-pin (J-6082-141-A)
(6.5±0.1Vdc)
Switch block
Adjustment remote control (J-8)

Fig. 9-3.

9-2-2. Caution

1) Setting of switches
   Unless otherwise specified, set the switches to the following position for making adjustments.
   1. CAMERA/OFF/PLAYER switch
      ......CAMERA
   2. STANDBY switch
      ......STANDBY
   3. AUTO LOCK switch
      ......OFF
   4. WHITE BALANCE button
      ......INDOOR mode ("-☼-" indication appears on EVF.)
   5. FOCUS buttom
      ......MANUAL
   6. IRIS button
      ......CENTER
   7. SHUTTER SPEED button
      ......NORMAL
2) Adjustment order
   As a rule, adjust in described order.
3) Objects
   1. Color bar chart (standard picture frame)
      When making Adjustments by the use of a color bar chart, adjust the picture frame as shown in Fig. 9-4. (Standard picture frame)

Color Bar Chart Standard Picture Frame

Basically, adjust the color bar chart standard picture frame with the under-scanning monitor as shown in Fig. a.

1) Place a black window with the horizontal width same as that of a color bar pattern, respectively on left and right sides of the screen. (A=B)
2) Put together lower ends of the color pattern and under-scanning monitor in the vertical direction.

Fig. a

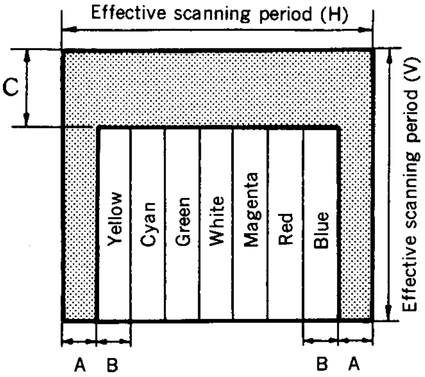

Effective scanning period (H)
C
Yellow
Cyan
Green
White
Magenta
Red
Blue
Effective scanning period (V)
A B
B A

Fig. b

Fig. c

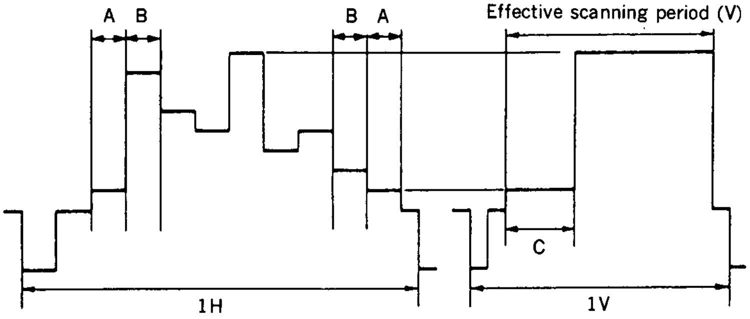

A B
B A
Effective scanning period (V)
C
1H
1V

Fig. 9-4.

2. All white pattern
   Remove a color bar chart from the pattern box and set fully to the TELE side.
3. Siements star (J-6080-875-A)
   orient a camera to have the siemens star center coincide with the monitor screen center on a monitor TV screen.
4. Chart for flange back adjustment
   Prepare a chart as shown in Fig. 9-5 by combining white and black sheets of vellum paper of A0 size (1189mm×841mm).

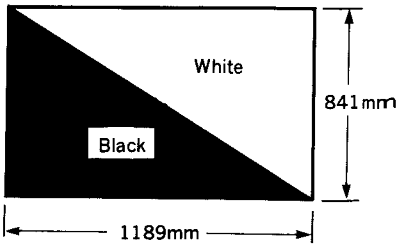

White
Black
841mm
1189mm

Fig. 9-5.

Note: Nonreflective, glazed vellum paper should be used. Prepare so that there is no concave or convex in the border between the black and white parts.

9-2-3. Adjustment Remote Control and Adjustment Address

The camera block uses the EVR (Electronic Variable Resistor) as an adjustment element in place of a conventional semi-fixed resistor. This EVR is controlled by the EVR/AWB microcomputer (VC-106 board IC261). This microcomputer reads data written in a non-volatile memory within the microcomputer and sends it to the EVR. The EVR generates an adjustment voltage by digital-to-analog converting this data (8 bits for one adjustment point).

To adjust the camera block, therefore, it is required to rewrite the adjustment data written in the non-volatile memory. The adjustment remote control is used for this purpose. The remote control permits bidirectional communications with the microcomputer in the camera block through a remote control signal line (LANC). UP/DOWN commands for adjustment page, address and data are sent from the remote control to the microcomputer in the camera block. Sent from the microcomputer in the camera clock to the remote control are adjustment page, address and data.

Note : The microcomputer IC within the adjustment remote control, if other than new microcomputer (μPD7503G-C56-12), does not allow page selection. If so, replace it by new microcomputer (8-759-148-35).

1. How to Use the Adjustment Remote Control

1) Connect the adjustment remote control to the REMOTE terminal (HL-4 board J501).

   Note : Place the HOLD switch on the adjustment remote control in the HOLD position (SERVICE position) to enter ADJ Mode.

2) Turn the power to the main unit ON.
3) If the connection is correct, the following display will appear on the adjustment remote control LCD. (The adjustment data varies from set to set.)

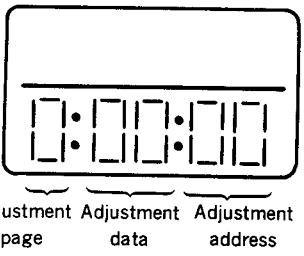


Fig. 9-6.

4) Specify the desired adjustment page with the adjustment remote control.

   Press the EDIT SEARCH (+) button to increment the adjustment page. Press the EDIT SEARCH (—) button to decrement it.

5) Specify the desired adjustment address with the adjustment remote control. Press the FF (▶▶) button to increment the adjustment address. Press the REW (◀◀) button to decrement it.

   (Adjustment addresses are expressed in their hexadecimal numbers and there are 256 numbers from 00 to FF. These adjustment addresses correspond to the EVR output pins (IC204, IC251 and IC255 on VC-106 board). See Table 9-2 for the contents of the adjustment for each address.)

6) Adjust by increasing or decreasing the adjustment data at a specific address.

   Press the PLAY (▶) button to increase the adjustment data.

Press the STOP (■) button to decrease it.

7) To adjust on page D, set the data on page 0, address 00 to 01.

   To adjust on page F, set the data on page 5, address 00 to 01 or 80. (this releases PROTECT)

- Adjustment data are expressed in their hexadecimal numbers and there are 256 numbers from 00 to FF.

Hexadecimal No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Indication of LCD	0	1	2	3	4	5	6	7	8	9	A	b	c	d	E	F
Decimal converted value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Table 9-1.

- These adjustment data correspond to the EVR output voltages (IC204, IC251 and IC255 on VC-106 board) as follows:

  VC-106 board IC204 outputs 2.0 to 4.9Vdc; VC-106 board IC251 outputs 0 to 4.9Vdc; VC-106 board IC255 outputs 1.0 to 3.5Vdc. These output voltages can be varied in 256 steps within their ranges.)

8) To store adjustment data into the built-in non-volatile memory in the EVR/AWB microcomputer (VC-106 board IC261), press the PAUSE button on the adjustment remote control. (If this operation is omitted, new adjustment data will not be stored into the non-volatile memory.)
9) There is a function provided to make a note of the last error/failure caused during operation of the set by the COUNTER RESET button so that its information will be maintained even after the power is turned off. This LAST MEMO EMERGENCY (last error/failure) can be cleared.

2. Caution for Using the Adjustment Remote Control

An erroneous operation of the adjustment remote control may delete correct adjustment data. To avoid this, it is recommended to make a note of all the adjustment data before entering adjustment and to make a note of new adjustment data each time adjustment for one item is completed.

3. List of Adjustment Addresses

- Use the adjustment page F for camera part adjustment of this unit.

Adjustment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column	Average Column
01	VC-106 board IC204 pin⑱	R CONT	Auto white balance adjustment		
02	VC-106 board IC204 pin⑲	B CONT			
03	VC-106 board IC204 pin②	C_1 GAIN	Matrix (3) C_1 gain adjustment		
04	VC-106 board IC204 pin③	B GAIN	Pre-white balance adjustment		
05	VC-106 board IC204 pin④	R GAIN			
06	VC-106 board IC204 pin⑤	Y_2 GAIN	Matrix (2) Y_2 gain adjustment		
07	VC-106 board IC204 pin⑥	Y_1 GAIN	Matrix (1) Y_1 gain adjustment		
08	VC-106 board IC204 pin⑦	Y_H GAIN	Y_H level adjustment		
09	VC-106 board IC204 pin⑧	R-Y GAIN	Color reproducibility adjustment		
0A	VC-106 board IC204 pin⑨	B-Y GAIN			
0B	VC-106 board IC204 pin⑫	R-Y HUE			
0C	VC-106 board IC204 pin⑬	B-Y HUE			
0D	VC-106 board IC251 pin⑱	SHP LEVEL	H aperture adjustment		
0E	VC-106 board IC251 pin⑲	Y LEVEL	White clip, Y level adjustment		
0F	VC-106 board IC251 pin②	VAP GAIN		90	
10	VC-106 board IC251 pin③	SET UP	Set up adjustment		
11	VC-106 board IC251 pin④	C LEVEL	Chroma level adjustment		
12	VC-106 board IC251 pin⑤	VSUB CONT	V SUB adjustment		
13	VC-106 board IC251 pin⑥	PG CONT	PG CONT adjustment		
14	VC-106 board IC251 pin⑦	$Y\gamma$ CONT		AE	
15	VC-106 board IC251 pin⑧	WHITE CLIP	White clip adjustment		
16	VC-106 board IC251 pin⑨	SYNC LEVEL	Sync level adjustment		
17	VC-106 board IC251 pin⑫	BURST LEVEL	Burst level adjustment		
18	VC-106 board IC251 pin⑬	MAX GAIN	Set up, Max gain adjustment		
19	VC-106 board IC255 pin⑱	IRIS REF	Iris adjustment		
1A	VC-106 board IC255 pin⑲	AGC REF	AGC adjustment		
1B	VC-106 board IC255 pin②	HALL GAIN	Hall adjustment		
1C	VC-106 board IC255 pin③	HALL OFFSET			
1D	VC-106 board IC255 pin④	FADER MODE		00	
1E	VC-106 board IC255 pin⑤	R-Y MIX		FF	
1F	VC-106 board IC255 pin⑥	B-Y MIX		8E	
20	VC-106 board IC255 pin⑦	TH CONT		D0	
21	VC-106 board IC255 pin⑧	FADER CONT		00	
22	VC-106 board IC255 pin⑨	ZOOM SPEED		00	
23	VC-106 board IC255 pin⑫	M IRIS CONT		00	
24	VC-106 board IC255 pin⑬	M AGC CONT		00	
25		S LANC DRIVE		00	
26		FB TELE SLOW		E0	
27		FB PEAK H		0A	
28		FB PEAK L		BB	
29		FOCUS LIMIT		FF	

Fig. 9-2.(1)

Adjust-ment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column	Average Column
2A		ZOOM SPEED 1		20	
2B		ZOOM SPEED 2		08	
2C		ZOOM SPEED 3		3D	
2D		FOCUS STEP H		01	
2E		FOCUS STEP L		20	
2F		TELE PEAK TH		10	
30		FB WIDE TIME		00	
31		FB ZOOM H		03	
32		FB ZOOM L		D0	
33		NOSERVO TIME		FF	
34		INIT STEP H			
35		INIT STEP L			
36		WEATHER TH		A0	
37		IN-OUT TH		60	
38		TELE DATA H			
39		TELE DATA L			
3A		NORM WIDE H			
3B		NORM WIDE L			
3C		NOSERVO SPD		20	
3D		HANT F SPD		06	
3E		PEAK BTTM H		01	
3F		PEAK BTTM L		95	
40		JIG 0	Auto focus check		
41		JIG 1			
42		JIG 2			
43		JIG 3			
44		JIG 4			
45		JIG 5			
46		T ZOOM LMT H		0F	
47		T ZOOM LMT L		E8	
48		W ZOOM LMT H		00	
49		W ZOOM LMT L		14	
4A		WIDE STEP H		00	
4B		WIDE STEP L		E7	
4C		FH SLOPE 1		08	
4D		FH SLOPE 2		08	
4E		LANC TELE		C2	
4F		LANC WIDE		3E	
50		FH WHITE		02	
51		FH AGC		03	
52		FH BLACK		09	
53		FA WHITE		01	
54		FA AGC		02	

Fig. 9-2.(2)

Adjustment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column	Average Column
55		FA BLACK		04	
56		HANT Z SPD		00	
57		MF TELE		90	
58		MF WIDE		80	
59		ERR ENA STEP		05	
5A		FH REF		40	
5B		WIDE COUNT 2		02	
5C		EMER ENABLE		00	
5D		JIG 1 PAGE	Auto focus check	00	
5E		ABS POSI H		00	
5F		ABS POSI L		00	
60		————			
61		————			
62		————			
63		M IRIS REF	Manual iris data adjustment		
64		GAIN REF	Manual gain data adjustment		
65		GAIN MAX		E0	
66		————			
67		————			
68		————			
69		————			
6A		————			
6B		————			
6C		————			
6D		————			
6E		————			
6F		————			
70		IRIS F1.7		46	
71		IRIS F2		63	
72		IRIS F2.4		76	
73		IRIS F2.8		85	
74		IRIS F3.4		8F	
75		IRIS F4		98	
76		IRIS F4.8		9E	
77		IRIS F5.6		A3	
78		IRIS F6.8		A9	
79		IRIS F8		AE	
7A		IRIS F9.6		B3	
7B		IRIS F11		B8	
7C		IRIS F14		C2	
7D		IRIS F16		CC	
7E		IRIS F19		D3	
7F		IRIS F22		D8	

Fig. 9-2.(3)

Adjustment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column	Average Column
80		————			
81		————			
82		————			
83		————			
84		————			
85		————			
86		————			
87		————			
88		————			
89		————			
8A		————			
8B		————			
8C		————			
8D		————			
8E		————			
8F		————			
90		R3200 MSB			
91		R3200 LSB			
92		B3200 MSB			
93		B3200 LSB			
94		G3200 MSB			
95		G3200 LSB			
96		SHUTTER IN		B1	
97		SHUTTER OUT		8B	
98		IRIS IN		9B	
99		IRIS OUT		A5	
9A		————			
9B		————			
9C		————			
9D		————			
9E		————			
9F		————			
A0		————			
A1		————			
A2		————			
A3		————			
A4		————			
A5		————			
A6		————			
A7		————			
A8		————			
A9		————			

Fig. 9-2.(4)

Adjust-ment Address	Adjustment Voltage Output Terminal	Adjustment Item	Remarks	Memo Column	Average Column
AA		————			
AB		————			
AC		BTM SLP R		48	
AD		BTM SLP B		78	
AE		MDL SLP R		60	
AF		MDL SLP B		40	
B0		TOP SLP R		66	
B1		TOP SLP B		18	
B2		KEIKO R		66	
B3		KEIKO B		18	
B4		BTM UP		C2	
B5		BTM DWN		95	
B6		MDL UP		AD	
B7		MDL DWN		96	
B8		TOP UP		78	
B9		TOP DWN		60	
BA		KEIKO		6C	
BB		KEIKO DWN		60	
BC		R TOP LMT		6E	
BD		R DWN LMT		21	
BE		B TOP LMT		8C	
BF		B IN TOP		65	
C0		B IN MAX		5C	
C1		B OUT MIN		5C	
C2		B OUT DWN		4A	
C3		B DWN LMT		1B	
C4		LL LMT		06	
C5		TM DIVID		5C	
C6		BM DIVID		39	
C7		DELAY TM		07	
C8		FAST TM		40	
C9		OUT HYS OFF		0E	
CA		OUT B HYS		07	
CB		————			
CC		————			
CD		————			
CE		APCNCUT STRT		C0	
CF		APCNCUT SLPE		01	
D0		SYS CONFIG		05	
D1		————			
D2		————			

Fig. 9-2.(5)

<table>
<tr><th>Adjust-ment Address</th><th>Adjustment Voltage Output Terminal</th><th>Adjustment Item</th><th>Remarks</th><th>Memo Column</th><th>Average Column</th></tr>
<tr><td>D3</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>D4</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>D5</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>D6</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>D7</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>D8</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>D9</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>DA</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>DB</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>DC</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>DD</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>DE</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>DF</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>E0</td><td></td><td>DISPLAY MODE</td><td>The following adjustment modes are selected by changing the adjustment data :
<table>
<tr><th>Adjustment data</th><th>Adjustment mode</th></tr>
<tr><td>00</td><td>R CONT, B CONT</td></tr>
<tr><td>01</td><td>NEW R, NEW B</td></tr>
<tr><td>02</td><td>R RATIO</td></tr>
<tr><td>03</td><td>B RATIO</td></tr>
<tr><td>04</td><td>R GAIN</td></tr>
<tr><td>05</td><td>B GAIN</td></tr>
<tr><td>06</td><td>RM DATA</td></tr>
<tr><td>07</td><td>GM DATA</td></tr>
<tr><td>08</td><td>BM DATA</td></tr>
<tr><td>0A</td><td>WHITE R, WHITE B</td></tr>
<tr><td>0B</td><td>R DATA</td></tr>
<tr><td>0C</td><td>G DATA</td></tr>
<tr><td>0D</td><td>B DATA</td></tr>
<tr><td>0E</td><td>R, B AIM</td></tr>
<tr><td>0F</td><td>ERROR, ERROR 2</td></tr>
<tr><td>11</td><td>IRIS, SHTR</td></tr>
</table></td><td></td><td></td></tr>
<tr><td>E1</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>E2</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>E3</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>E4</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>E5</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>E6</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>E7</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>E8</td><td></td><td>————</td><td></td><td></td><td></td></tr>
</table>

Fig. 9-2.(6)

<table>
<tr><th>Adjust-ment Address</th><th>Adjustment Voltage Output Terminal</th><th>Adjustment Item</th><th>Remarks</th><th>Memo Column</th><th>Average Column</th></tr>
<tr><td>E9</td><td></td><td>ADJUST MODE</td><td>The following adjustment modes are selected by changing the adjustment data :
<table>
<tr><th>Adjustment data</th><th>Adjustment mode</th></tr>
<tr><td>00</td><td>NORMAL</td></tr>
<tr><td>03</td><td>S LANC CONTROL MODE</td></tr>
<tr><td>05</td><td>AF SKIP MODE</td></tr>
<tr><td>07</td><td>SERVICE MODE</td></tr>
<tr><td>09</td><td>FORCED WOBBLING MODE</td></tr>
<tr><td>0B</td><td>FORCED HATCHING MODE</td></tr>
<tr><td>0D</td><td>ZOOM HATCHING MODE</td></tr>
<tr><td>0F</td><td>FLANGE BACK ADJ MODE</td></tr>
<tr><td>13</td><td>ABS MOVERENT MODE</td></tr>
</table></td><td></td><td></td></tr>
<tr><td>EA</td><td></td><td>COMMAND MODE</td><td>The following adjustment modes are selected when the adjustment data at adjustment address E9 is 03 and 07 :
<table>
<tr><th>Adjustment data</th><th>Adjustment mode</th></tr>
<tr><td>03</td><td>SEPARATE MODE</td></tr>
<tr><td>07</td><td>AUTO FOCUS MODE</td></tr>
</table></td><td></td><td></td></tr>
<tr><td>EB</td><td></td><td>MODE</td><td>The following adjustment modes are selected by changing the adjustment data :
<table>
<tr><th>Adjustment data</th><th>Adjustment mode</th></tr>
<tr><td>00</td><td>NORMAL MODE</td></tr>
<tr><td>01</td><td>ZOOM POSITION (High)</td></tr>
<tr><td>03</td><td>ZOOM POSITION (Low)</td></tr>
<tr><td>05</td><td>AD HALL</td></tr>
<tr><td>0B</td><td>AD AGC CONT</td></tr>
<tr><td>0D</td><td>FOCUS POSITION (High)</td></tr>
<tr><td>0F</td><td>FOCUS POSITION (Low)</td></tr>
<tr><td>20</td><td>FOCUS, FA, FH, ZOOM</td></tr>
<tr><td>21</td><td>Set by addesses 40 to 45</td></tr>
<tr><td>22</td><td>FB ADJ Results, INIT DATA, TELE, WIDE</td></tr>
<tr><td>F9</td><td>FA (Evaluation value for variable frame, every V output)</td></tr>
<tr><td>FB</td><td>FH (Evaluation value for variable frame, every V output)</td></tr>
</table></td><td></td><td></td></tr>
</table>

Fig. 9-2.(7)

<table>
<tr><th>Adjust-ment Address</th><th>Adjustment Voltage Output Terminal</th><th>Adjustment Item</th><th>Remarks</th><th>Memo Column</th><th>Average Column</th></tr>
<tr><td>EC</td><td></td><td>AWB MODE 3</td><td></td><td>01</td><td></td></tr>
<tr><td>ED</td><td></td><td>AWB MODE 2</td><td></td><td>00</td><td></td></tr>
<tr><td>EE</td><td></td><td>AWB MODE 1</td><td>The following auto white balance adjustment modes are selected by changing the adjustment data :
<table>
<tr><th>Adjustment data</th><th>Adjustment mode</th></tr>
<tr><td>00</td><td>NORMAL MODE</td></tr>
<tr><td>01</td><td rowspan="2">3200K PRESET DATA FETCH</td></tr>
<tr><td>23</td></tr>
<tr><td>D0</td><td>OUT DOOR ADJUSTMENT MODE</td></tr>
<tr><td>F0</td><td>ALL AREA PULL-IN MODE</td></tr>
</table></td><td></td><td></td></tr>
<tr><td>EF</td><td></td><td>CAM ALONE</td><td>The following adjustment modes are selected by changing the adjustment data :
<table>
<tr><th>Adjustment data</th><th>Adjustment mode</th></tr>
<tr><td>00</td><td>NORMAL MODE</td></tr>
<tr><td>F0</td><td>CAM ALONE MODE</td></tr>
</table></td><td></td><td></td></tr>
<tr><td>F0</td><td></td><td>————</td><td>Office Code</td><td></td><td></td></tr>
<tr><td>F1</td><td></td><td>————</td><td>Model Destination Code</td><td>02</td><td></td></tr>
<tr><td>F2</td><td></td><td>————</td><td>Shipping Date Code</td><td></td><td></td></tr>
<tr><td>F3</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>F4</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>F5</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>F6</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>F7</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>F8</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>F9</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>FA</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>FB</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>FC</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>FD</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>FE</td><td></td><td>————</td><td></td><td></td><td></td></tr>
<tr><td>FF</td><td></td><td>————</td><td></td><td></td><td></td></tr>
</table>

Fig. 9-2.(8)

9-2-4. Checkpoint Array (CPA)

Most points of measurement used for adjusting the camera block are on the checkpoint array of the VC-106 board. Solder a short lead wire, etc. to necessary pins for your adjustment, and connect an oscilloscope or other measuring equipment. Table 9-3 shows the pin numbers and signals for the checkpoint array.

Note : The CPA connector jig can be used to connect an oscilloscope or other measuring equipment easily.

Pin No.	Signal	Pin No.	Signal
A1	N.C	B1	N.C
A2	PG CONT	B2	N.C
A3	N.C	B3	Y LPF OUT
A4	CAM Y (Not allowed to be used for adjustment)	B4	V SUB
A5	VAP OUT	B5	VAP SLICE
A6	TP	B6	N.C
A7	WB-G	B7	Y_H GAIN
A8	CAM Y	B8	Y_2 GAIN
A9	N.C	B9	N.C
A10	CAM C	B10	GND
A11	YH OUT 1	B11	IRIS OUT

Table 9-3.

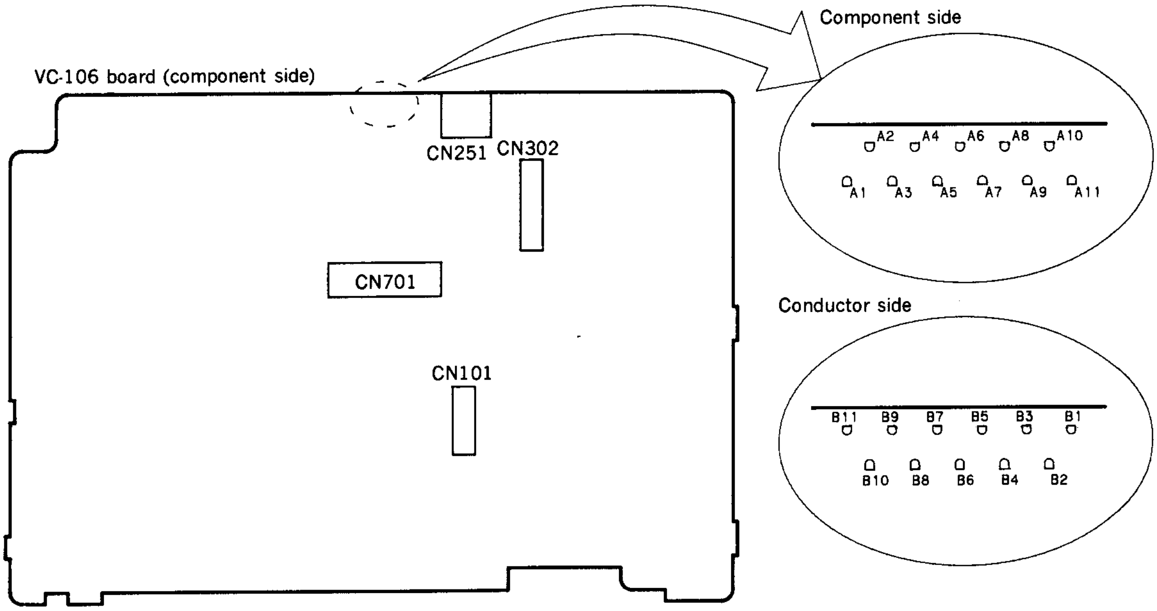

VC-106 board (component side)
CN251
CN302
CN701
CN101
Component side
A2
A4
A6
A8
A10
A1
A3
A5
A7
A9
A11
Conductor side
B11
B9
B7
B5
B3
B1
B10
B8
B6
B4
B2

Fig. 9-7.

9-2-5. AF Microcomputer Data Reader Jig

The AF microcomputer data reader jig converts adjustment serial data outputted from the AF microcomputer (different data are outputted depending on the adjustment mode, such as HALL (iris) state, focus state, focus motor speed, zoom ring position, etc.) into 2-digit hexadecimal numbers and indicates on the LED.

[Connection]

Connect as shown in the figure below :

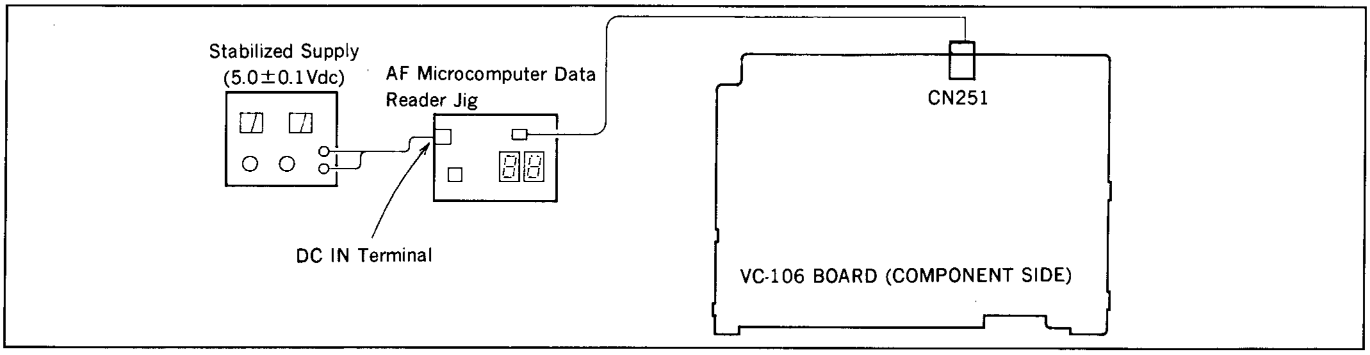

Stabilized Supply
(5.0±0.1Vdc)
AF Microcomputer Data Reader Jig
DC IN Terminal
CN251
VC-106 BOARD (COMPONENT SIDE)

Fig. 9-8.

9-2-6. Data Processing

In order to obtain adjustment data in some adjustment items, it is necessary to compute the display data (hexadecimal number) of the AF microcomputer data reader jig and adjustment remote control. In this case, convert the hexadecimal number into the decimal number before computation, convert its computed result back into the decimal number to assume it as the adjustment data. Table 9-4 shows a hexadecimal-decimal conversion table.

Hexadecimal — Decimal Conversion Table

Higher Digit of Hex. No. / Lower Digit of Hex. No.	0	1	2	3	4	5	6	7	8	9	A (A)	B (b)	C (c)	② ↓ D (d)	E (E)	F (F)
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
5	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A(A)	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
①→ B(b)	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
C(c)	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D(d)	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E(E)	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F(F)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

Note: Values in parentheses are those displayed on the AF microcomputer reader jig or adjustment remote control.

(Example) When the AF microcomputer reader jig or adjustment remote control displays "BD (bd);
Since the higher digit of the hexadecimal number is B (b) and its lower digit is D (d), the decimal number to be obtained is "189" at an intersecting point of ① and ② in the table above.

Table. 9-4.

9-3. CAMERA SYSTEM ADJUSTMENT

- It is expected that all the adjustments be performed in the sequence that they are described.
- When the CCD imager has been replaced, remember to perform all the adjustments provided for the camera system.

[Adjustment Sequence]

1. Camera DC-DC Converter Voltage Check
2. Camera Microcomputer Data Setting for Adjustment Pages D and F
3. Prime Oscillation Adjustment
4. PLL Adjustment
5. PG CONT/V SUB Adjustment
6. Sync Level Adjustment
7. Setup Adjustment
8. Iris Adjustment
9. AGC Adjustment
10. Matrix Adjustment
11. Y_H Level Adjustment
12. Chroma Level Adjustment
13. White Clip Adjustment
14. Y Level Adjustment
15. Max Gain Adjustment
16. H Aperture Adjustment
17. Burst Level Adjustment
18. Pre-white Balance Adjustment
19. Color Reproducibility Adjustment
20. Flange Back Adjustment and Check
21. Hall Adjustment
22. Auto White Balance Adjustment
23. Manual Gain Reference Setting
24. Manual Iris Data Adjustment
25. Outdoor White Balance Check
26. Auto Focus Check
27. Brightness Correction Check
28. Digital Titler Picture Quality Check

9-3-1. Camera DC-DC Converter Voltage Check (DD-33P Board)

Measuring instrument	Digital voltmeter
CAM 15V check	
Measurement Point	CN102 pin ⑧ (JL303)
Specified value	15.0±0.15Vdc
CAM −9V check	
Measurement Point	CN102 pin ⑦ (JL305)
Specified value	−9.00±0.30Vdc
CAM 5V check	
Measurement Point	CN102 pin ⑤ (JL307)
Specified value	4.92±0.03Vdc

[Checking Method]

1) Each power supply voltage meets the specified value at ordinary temperature and humidity.

9-3-2. Camera Microcomputer Data Setting for Adjustment Pages D and F

[D Page Setting Method]

1) To release adjustment page D from PROTECT, set to adjustment page 0, adjustment address 00, and adjustment data 01 with the adjustment remote control.
2) Set to adjustment page D with the adjustment remote control. Then write the initial value. (See Table 9-5.)
3) After changing adjustment data, to store the new data, press the PAUSE button on the adjustment remote control before changing the address.

[F Page Setting Method]

1) To release adjustment page F from PROTECT, set to adjustment page 5, adjustment address 00, and adjustment data 80 with the adjustment remote control.
2) Set to adjustment page F with the adjustment remote control. Then write the initial value. (See Table 9-6.)
3) After changing adjustment data, to store the new data, press the PAUSE button on the adjustment remote control before changing the address.

Note : The adjustment data should be initialized only when the CCD imager is replaced.
The data for the old microcomputer should remain intact when the EVR/AWB microcomputer is replaced.

Table 9-5 VTR EE-PROM Memory Map on Adjustment Page D

Page	Address	Contents		Data	Remarks
D	00	Category Code (destination)		01	Fixed
	01	Test Mode		00	*
	02	Battery End Adjustment		00	Adjust
	03	Switching Position Adjustment LOW		00	Not used
	04	Switching Position Adjustment HIGH		80	Adjust
	05	Specification Change by Destination Flag		AEP,UK:90 E,AUS:91	Fixed
	06	Emergency Code First		00	*
	07	Emergency Code Last		00	*
	08	Emergency Mode First		00	*
	09	Emergency Mode Last		00	*
	0A			00	Not used
	0B			00	Not used
	0C			00	Not used
	0D			00	Not used
	0E			00	Not used
	0F			00	Not used
	10	ϕII SR Data	EDIT OFF MP HI8 LP	5F	Fixed
	11		EDIT OFF MP HI8 SP	65	Fixed
	12		EDIT OFF MP NOR LP	5C	Fixed
	13		EDIT OFF MP NOR SP	68	Fixed
	14		EDIT OFF ME HI8 LP	65	Fixed
	15		EDIT OFF ME HI8 SP	69	Fixed
	16		EDIT OFF ME NOR LP	5C	Fixed
	17		EDIT OFF ME NOR SP	68	Fixed
	18		EDIT ON * * HI8 * *	65	Fixed
	19		EDIT ON * * NOR * *	5C	Fixed
	1A			00	Not used
	1B			00	Not used
	1C			00	Not used
	1D			00	Not used
	1E			00	Not used
	1F			00	Not used
	20	MP REC C 1A		FF	Adjust
	21	MP REC C 1B		FF	Adjust
	22	MP REC C 2A		FF	Adjust
	23	MP REC C 2B		FF	Adjust
	24	ME PILOT CONT		90	Fixed
	25	ME RF CONT		58	Fixed
	26	ME REC C 1A		FF	Adjust
	27	ME REC C 1B		FF	Adjust
	28	ME REC C 2A		FF	Adjust
	29	ME REC C 2B		FF	Adjust
	2A	REC Y		FF	Adjust
	2B	C FG OFF SET		80	Adjust
	2C	MP PILOT CONT		90	Fixed
	2D	MP RF CONT		58	Fixed
	2E			00	Spare
	2F			00	Spare
	30			00	Spare
	31			00	Spare

Note: "*" mark represents the TEST and SERVICE Modes.

Table 9-6. Preset Data of Adjustment Page F.

Adjustment Address	Adjustment Data Initial Value
01 (R CONT)	61
02 (B CONT)	6C
03 (C1 GAIN)	88
04 (B GAIN)	8D
05 (R GAIN)	84
06 (Y2 GAIN)	9B
07 (Y1 GAIN)	A2
08 (YH GAIN)	32
09 (R-Y GAIN)	B5
0A (B-Y GAIN)	84
0B (R-Y HUE)	5A
0C (B-Y HUE)	50
0D (SHP LEVEL)	97
0E (Y LEVEL)	9C
0F (VAP GAIN)	90
10 (SET UP)	95
11 (C LEVEL)	7F
12 (V SUB CONT)	3A
13 (PG CONT)	5A
14 (Yγ CONT)	AE
15 (WHITE CLIP)	FF
16 (SYNC LEVEL)	C2
17 (BURST LEVEL)	D9
18 (MAX GAIN)	E0
19 (IRIS REF)	4C
1A (AGC REF)	72
1B (HALL GAIN)	6E
1C (HALL OFFSET)	8A
1D (FADER MODE)	00
1E (R-Y MIX)	FF
1F (B-Y MIX)	8E
20 (TH CONT)	D0
21 (FADER CONT)	00
22 (ZOOM SPEED)	00
23 (M IRIS CONT)	00
24 (M AGC CONT)	00
25 (S LANC DRIVE)	00
26 (FB TELE SLOW)	E0
27 (FB PEAK H)	0A
28 (FB PEAK L)	BB
29 (FOCUS LIMIT)	FF

Table 9-6 (1)

2A (ZOOM SPEED 1)	20
2B (ZOOM SPEED 2)	08
2C (ZOOM SPEED 3)	3D
2D (FOCUS STEP H)	01
2E (FOCUS STEP L)	20
2F (TELE PEAK TH)	10
30 (FB WIDE TIME)	00
31 (FB ZOOM H)	03
32 (FB ZOOM L)	D0
33 (NOSERVO TIME)	FF
34 (INIT STEP H)	00
35 (INIT STEP L)	C0
36 (WEATHER TH)	A0
37 (IN-OUT H)	60
38 (TELE DATA H)	0F
39 (TELE DATA L)	FF
3A (NORM WIDE H)	00
3B (NORM WIDE L)	00
3C (NOSERVO SPD)	20
3D (HANT F SPD)	06
3E (PEAK BTTM H)	01
3F (PEAK BTTM L)	95
46 (T ZOOM LMT H)	0F
47 (T ZOOM LMT L)	E8
48 (W ZOOM LMT H)	00
49 (W ZOOM LMT L)	14
4A (WIDE STEP H)	00
4B (WIDE STEP L)	E7
4C (FH SLOPE 1)	08
4D (FH SLOPE 2)	08
4E (LANC TELE)	C2
4F (LANC WIDE)	3E
50 (FH WHITE)	02
51 (FH AGC)	03
52 (FH BLACK)	09
53 (FA WHITE)	01
54 (FA AGC)	02
55 (FA BLACK)	04
56 (HANT Z SPD)	00
57 (MF TELE)	90
58 (MF WIDE)	80
59 (ERR ENA STEP)	05

Table 9-6 (2)

5A (FH REF)	40
5B (WIDE COUNT 2)	02
5C (EMER ENABLE)	00
5D (JIG 1 PAGE)	00
5E (ABS POSI H)	00
5F (ABS POSI L)	00
63 (M IRIS REF)	AA
64 (GAIN REF)	23
65 (GAIN MAX)	E0
70 (IRIS F1.7)	46
71 (IRIS F2)	63
72 (IRIS F2.4)	76
73 (IRIS F2.8)	85
74 (IRIS F3.4)	8F
75 (IRIS F4)	98
76 (IRIS F4.8)	9E
77 (IRIS F5.6)	A3
78 (IRIS F6.8)	A9
79 (IRIS F8)	AE
7A (IRIS F9.6)	B3
7B (IRIS F11)	B8
7C (IRIS F14)	C2
7D (IRIS F16)	CC
7E (IRIS F19)	D3
7F (IRIS F22)	D8
90 (R3200 MSB)	10
91 (R3200 LSB)	10
92 (B3200 MSB)	10
93 (B3200 LSB)	10
94 (G3200 MSB)	10
95 (G3200 LSB)	10
96 (SHUTTER IN)	B1
97 (SHUTTER OUT)	8B
98 (IRIS IN)	9B
99 (IRIS OUT)	A5
AC (BTM SLP R)	48
AD (BTM SLP B)	78
AE (MDL SLP R)	60
AF (MDL SLP B)	40

Table 9-6 (3)

B0 (TOP SLP R)	66
B1 (TOP SLP B)	18
B2 (KEIKO R)	66
B3 (KEIKO B)	18
B4 (BTM UP)	C2
B5 (BTM DWN)	95
B6 (MDL UP)	AD
B7 (MDL DWN)	96
B8 (TOP UP)	78
B9 (TOP DWN)	60
BA (KEIKO)	6C
BB (KEIKO DWN)	60
BC (R TOP LMT)	6E
BD (R DWN LMT)	21
BE (B TOP LMT)	8C
BF (B IN TOP)	65
C0 (B IN MAX)	5C
C1 (B OUT MIN)	5C
C2 (B OUT DWN)	4A
C3 (R DWN LMT)	1B
C4 (LL LMT)	06
C5 (TM DIVID)	5C
C6 (BM DIVID)	39
C7 (DELAY TM)	07
C8 (FAST TM)	40
C9 (OUT HYS OFF)	0E
CA (OUT B HYS)	07
CE (APCNCUT STRT)	C0
CF (APCNCUT SLPE)	01
D0 (SYS CONFIG)	05
EC (AWB MODE 3)	01
ED (AWB MODE 2)	00

Table 9-6 (4)

9-3-3. Prime Oscillation Adjustment (VC-106 Board)

Object	Any
Measurement Point	DT-77 board (HIC101) pin ③ (CL109)
Measuring instrument	Frequency counter
Adjustment element	CT101
Specified value	14187500±70Hz

Note : Connect a frequency counter through a buffer amplifier (etc., oscilloscope) having a high impedance and a low capacitance.

[Adjustment Method]

1) Adjust to 14187500±70Hz with CT101.

9-3-4. PLL Adjustment (VC-106 Board)

Object	Optional
Measurement Point	See Fig. 9-9. (CL152)
Measuring instrument	Digital voltmeter
Adjustment element	CT151
Specified value	2.5±0.1Vdc

[Adjustment Method]

1) Adjust to 2.5±0.1Vdc with CT151.

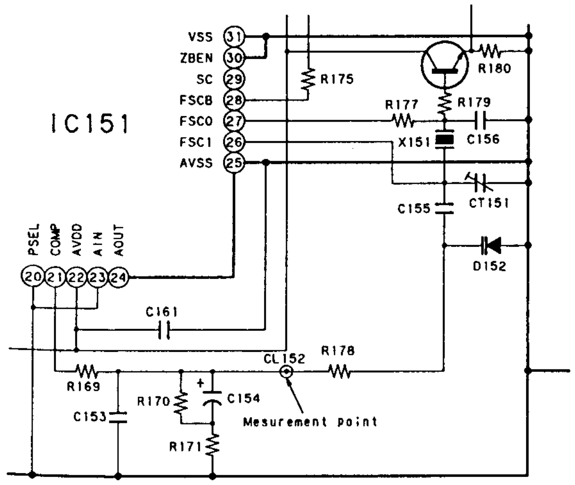
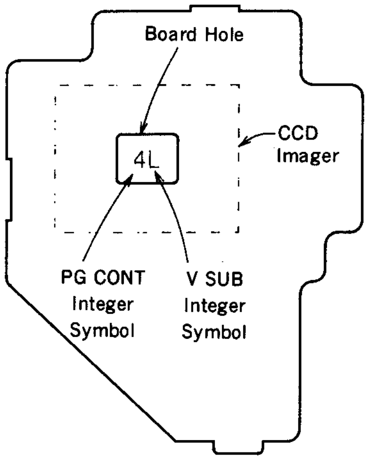

IC151
VSS ㉛
ZBEN ㉚
SC ㉙
FSCB ㉘
FSCO ㉗
FSCI ㉖
AVSS ㉕
PSEL ⑳
COMP ㉑
AVDD ㉒
AIN ㉓
AOUT ㉔
R175
R180
R177
R179
X151
C156
C155
CT151
D152
C161
CL152
R178
R169
R170
C154
C153
R171
Mesurement point

Fig. 9-9.

9-3-5. PG CONT/V SUB Adjustment (CD-74 Board/VC-106 Board)

Note : The PG CONT specification voltage and the V SUB specification voltage are indicated in two characters (the first for PG CONT and the second for V SUB) on the CCD imager as shown below.

CD-74 BOARD (COMPONENT SIDE)


Board Hole
CCD Imager
4L
PG CONT Integer Symbol
V SUB Integer Symbol

- PG CONT Adjustment

PG voltage conversion table	
Integer symbol	Voltage [V]
1	1.0
2	1.5
3	2.0
4	2.5
5	3.0
6	3.5
7	4.0

- V SUB Adjustment

V SUB voltage conversion table			
Integer symbol	Voltage [V]	Integer symbol	Voltage [V]
E	9.0	Q	14.0
F	9.5	R	14.5
G	10.0	S	15.0
H	10.5	T	15.5
J	11.0	U	16.0
K	11.5	V	16.5
L	12.0	W	17.0
M	12.5	X	17.5
N	13.0	Y	18.0
P	13.5	Z	18.5

Fig. 9-10.

A. PG CONT Adjustment

Object	No required
Measurement Point	Checkpoint array pin (A2)(PG CONT)
Measuring instrument	Digital voltmeter
Adjustment page	F
Adjustment address	13 (PG CONT)
Specified value	(CCD imager indicated voltage)±0.1Vdc

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00, and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 13 with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control to obtain (CCD imager indicated value)±0.1Vdc.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

B. V SUB Adjustment

Object	No required
Measurement Point	Checkpoint array pin (B4)(V SUB)
Measuring instrument	Digital voltmeter
Adjustment page	F
Adjustment address	12 (V SUB)
Specified value	(CCD imager indicated voltage) ±3%

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00, and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 12 with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control to obtain (CCD imager indicated value)±3%.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

9-3-6. Sync Level Adjustment (VC-106 Board)

Object	All black (Cover the lens with a black cap.)
Measurement point	Checkpoint array pin (A8)(CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	16 (SYNC LEVEL)
Specified value	150±5mV

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00, and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 16 with the adjustment remote control.
4) Change the adjustment data to adjust the sync level to 150±5mV.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

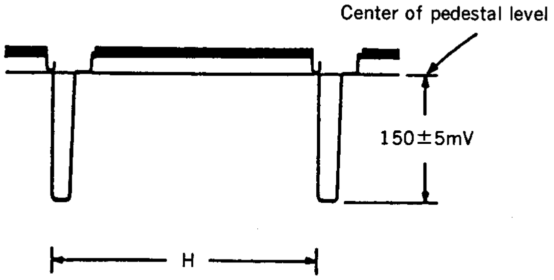


Fig. 9-11.

9-3-7. Setup Adjustment (VC-106 Board)

Object	All black (Cover the lens with a black cap.)
Measurement point	Checkpoint array pin (A8)(CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	10 (SET UP) 18 (MAX GAIN)
Specified value	0−5mV

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 18 with the adjustment remote control. Make a note of the adjustment data for this address (as data F), then preset the adjustment data to 00. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
4) Select adjustment address 10 with the adjustment remote control.
5) Change the adjustment data to adjust the setup level to 0−5mV. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
6) Select adjustment address 18 and input the data F.
7) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

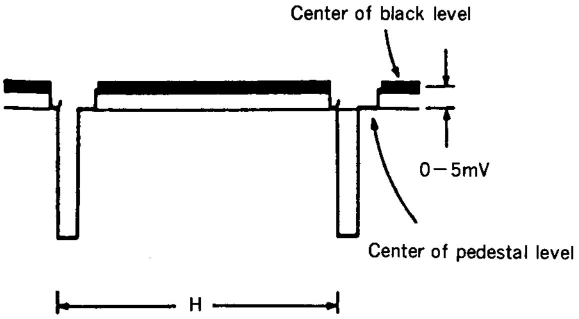


Fig. 9-12.

9-3-8. Iris Adjustment (VC-106 Board)

Object	Color bar chart standard picture frame
Filter	ND filters 0.5
Measurement point	Checkpoint array pin (B11)(IRIS OUT)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	19 (IRIS REF)
Specified value	150±5mVp-p

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 19 with the adjustment remote control.
4) With no ND filter attached, change the adjustment data to adjust the IRIS OUT signal level to 150±5mVp-p with the adjustment remote control. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
5) Attach the ND filter 0.5 in front of th lens and confirm that the signal level changes smoothly.
6) Remove the ND filter and check that the signal level is at 150±10mVp-p.
7) If the specification is not met, repeat Steps 4) to 6).
8) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

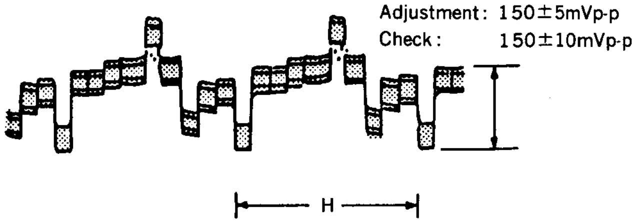


Fig. 9-13.

9-3-9. AGC Adjustment (VC-106 Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin (B3)(Y LPF OUT)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	1A (AGC REF)
Specified value	180±5mV

Note : If there is significant noise, insert a 5.6kΩ resistance for measurement.

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 1A with the adjustment remote control.
4) Change the adjustment data to adjust the signal level to 180±5mVp-p with the adjustment remote control.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

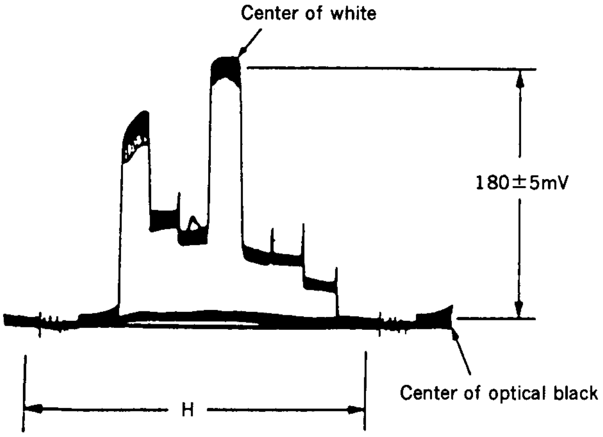


Fig. 9-14.

9-3-10. Matrix Adjustment
(1) Y_1 Gain Adjustment (VC-106 Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin (A5)(VAP OUT)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	07 (Y_1 GAIN)
Specified value	0±5mV

[Preparation]

1) Short the checkpoint array pin (B8)(Y_2 GAIN) and pin (B5) (VAP SLICE) with GND.

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 0F and preset the adjustment data to 00 (VAP GAIN : MAX) with the adjustment remote control. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
4) Select adjustment address 07 with the adjustment remote control.
5) Change the adjustment data with the adjustment remote control and adjust so that the waveform is a straight line (there should be no difference : 0±5mV).
6) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
7) Open the checkpoint array pin (B8) and pin (B5).

Note : After this adjustment, remember to perform Matrix Adjustment (2) Y_2 Gain Adjustment.

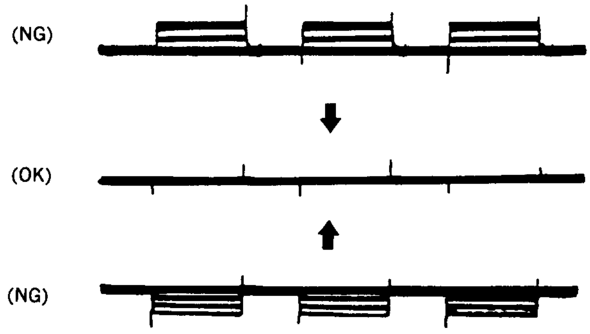


Fig. 9-15.

(2) Y_2 Gain Adjustment (VC-106 Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin (A5)(VAP OUT)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	06 (Y_2 GAIN)
Specified value	0±5mV

[Preparation]

1) Short the checkpoint array pin (B5)(VAP SLICE) with GND.

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 0F and preset the adjustment data to 00 (VAP GAIN: MAX) with the adjustment remote control. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
4) Select adjustment address 06 with the adjustment remote control.
5) Change the adjustment data with the adjustment remote control and adjust so that the waveform output is a straight line (there should be no difference: 0±5mV). Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
6) Select adjustment address 0F and set the adjustment data to 90 with the adjustment remote control.
7) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
8) Open the checkpoint array pin (B5).

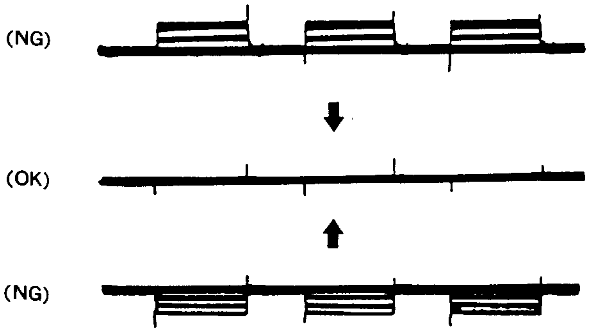


Fig. 9-16.

(3) C_1 Gain Adjustment (VC-106 Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array (A10) pin (CAM C) (IC254 pin ① and pin ㊼)
Measuring instrument	Vectorscope Oscilloscope
Adjustment page	F
Adjustment address	03 (C_1 GAIN)
Specified value	Reduce the bright point split to the minimum level. • Cyan, green ·········2.0mm max • Magenta ············1.0mm max • Others ················0.5mm max

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 03 with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control and adjust so that the bright point of each color is completely focused on one point within the specified value.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

When a vectorscope is used:

Specified value:		
	Cyan Green	2.0mm max
	Magenta	1.0mm max
	Others	0.5mm max

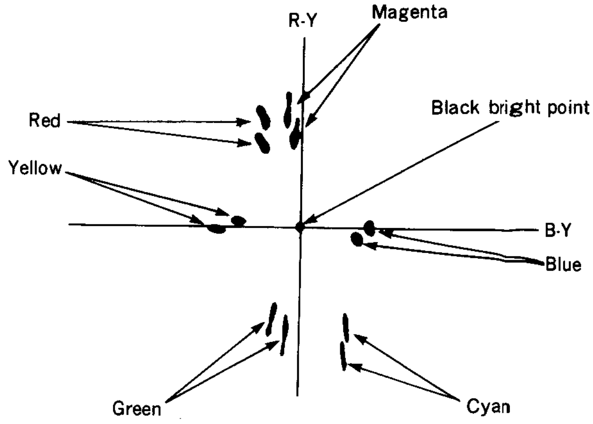


Fig. 9-17.

9-3-11. Y_H Level Adjustment (VC-106 Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin (A6)(TP)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	08 (Y_H GAIN)
Specified value	0±5mV

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 08 with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control and adjust so that the waveform output is a straight line (there should be no difference: 0±5mV).
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

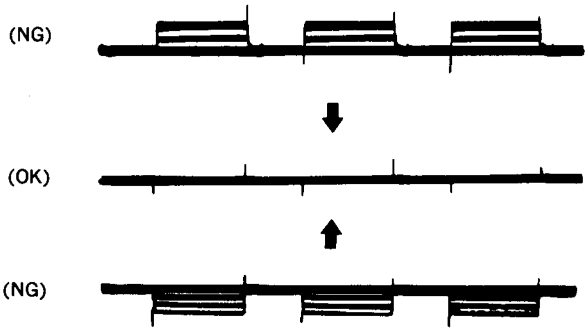


Fig. 9-18.

9-3-12. Chroma Level Adjustment (VC-106 Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin (A7)(WB-G)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	11 (C LEVEL)
Specified value	320±20mV

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 11 with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control and adjust the white level to 320±20mV.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

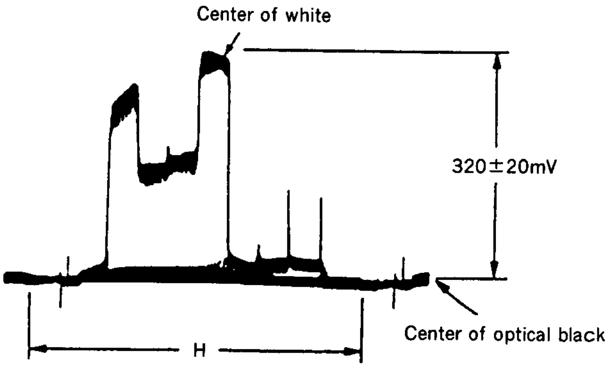


Fig. 9-19.

9-3-13. White Clip Adjustment (VC-106 Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin Ⓐ8(CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	15 (WHITE CLIP) 0E (Y LEVEL)
Specified value	420±10mV

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 0E and make a note of the adjustment data for this address (this data is treated as data G), then preset the adjustment data to FF with the remote control. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
4) Select adjustment address 15 with the adjustment remote control.
5) Change the adjustment data with the adjustment remote control and adjust the white clip level to 420±10mV. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
6) Select adjustment address 0E and input the data G with the adjustment remote control.
7) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

Note : After this adjustment, remember to perform Y Level Adjustment.

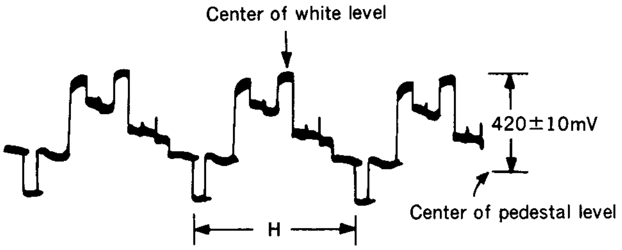


Fig. 9-20.

9-3-14. Y Level Adjustment (VC-106 Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin Ⓐ8(CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	0E (Y LEVEL)
Specified value	330±5mV

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 0E with the adjustment remote control.
4) Change the adjustment data to adjust the Y level to 330±5mV with the adjustment remote control.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

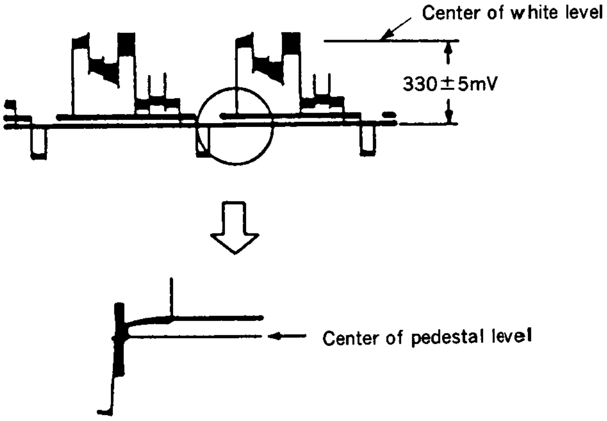


Fig. 9-21.

9-3-15. Max Gain Adjustment (VC-106 Board)

Object	Color bar chart standard picture frame
Filter	ND filter 2.9 (1.0+1.0+0.4+0.4+0.1)
Measurement point	Checkpoint array pin (A8)(CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	18 (MAX GAIN)
Specified value	125±5mV

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Cover the lens with the ND filter 2.9 (1.0+1.0+0.4+0.4+0.1).
3) Select adjustment page F with the adjustment remote control.
4) Select adjustment address 18 with the adjustment remote control.
5) Change the adjustment data to adjust the level to 125±5mV with the adjustment remote control.
6) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
7) After this adjustment, remove the ND filter 2.9.

Note: The ND filter 2.9 is prepared by combining four filters. However. if the ND filter 2.9 is prepared by combining your four or less filters, use your filter combination.

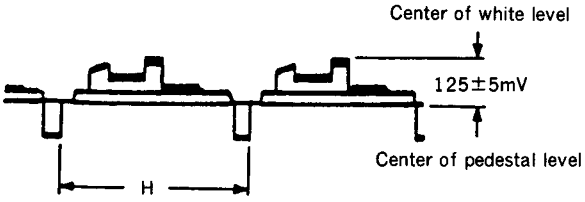


Fig. 9-22.

9-3-16. H Aperture Adjustment (VC-106 Board)

Object	Color bar chart standard picture frame
Measurement point	Checkpoint array pin (A8)(CAM Y)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	0D (SHP LEVEL)
Specified value	40±5mV

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Turn the FOCUS RING until the aperture level (waveform peak) is maximized.
4) Select adjustment address 0D with the adjustment remote control.
5) Change the adjustment data with the adjustment remote control and set the lower peak between "green" and "white" levels to a point 40±5mV from the pedestal level.
6) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

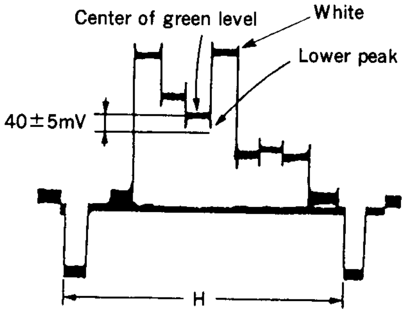


Fig. 9-23.

9-3-17. Burst Level Adjustment (VC-106 Board)

Object	All black (Cover the lens with a black cap.)
Measurement point	Checkpoint array pin (A10)(CAM C)
Measuring instrument	Oscilloscope
Adjustment page	F
Adjustment address	17 (BURST LEVEL)
Specified value	150±5mVp-p

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address 17 with the adjustment remote control.
4) Change the adjustment data to adjust the burst level to 150±5mVp-p.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

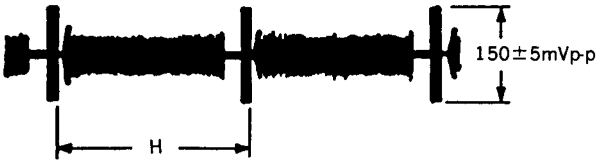


Fig. 9-24.

9-3-18. Pre-white Balance Adjustment

Object	All white standard picture frame
Measurement point	VIDEO OUT terminal of the video block
Measuring instrument	Vectorscope
Adjustment page	F
Adjustment address	05 (R GAIN) 04 (B GAIN)
Specified value	The center of a white bright point must be within a circle of 1mm diameter which is centered at the origin.

[Adjustment Method]

1) Maximize the gain of a vectorscope.
2) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
3) Select adjustment page F with the adjustment remote control.
4) Select adjustment address 05 with the adjustment remote control.
5) Change the adjustment data with the adjustment remote control to allow the white bright point to coincide with the origin.
   Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
6) Select adjustment address 04.
7) Change the adjustment data with the adjustment remote control to allow the white bright point to coincide with the origin.
   Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
8) Repeat Steps 4) to 7).
9) Return the gain of the vectorscope to CAL and make sure that the center of the bright point is within a circle of 1 mm dameter which is centered at the origin.
10) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

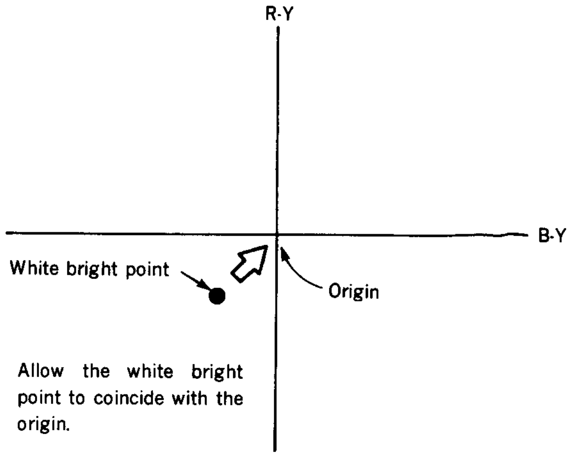


Fig. 9-25.

9-3-19. Color Reproducibility Adjustment

Object	Color bar chart standard picture frame
Measurement point	VIDEO OUT terminal of the video block
Measuring instrument	Vectorscope
Adjustment page	F
Adjustment address	09 (R-Y GAIN) 0A (B-Y GAIN) 0B (R-Y HUE) 0C (B-Y HUE)
Specified value	Every color bright point must be within the color reproduction frame.

Note : This adjustment assumes that both "Burst Level Adjustment" and "Pre-White Balance Adjustmet" have been previously completed.

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Change the adjustment data for each adjustment address with the adjustment remote control to allow every color bright point to fall within the specified color reproduction frame.
4) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

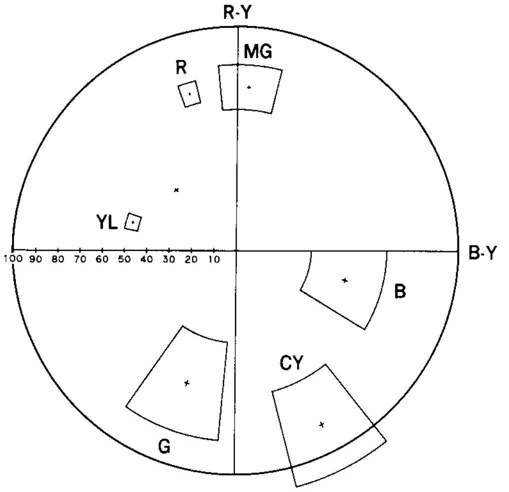


Fig. 9-26.

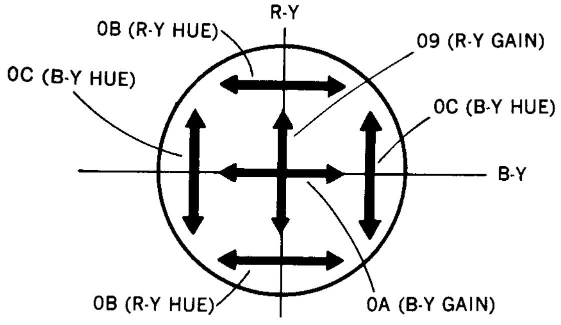


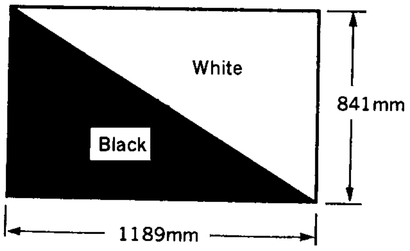
Fig. 9-27. Adjustment Address and Directions of Bright Point Movements

9-3-20. Flange Back Adjustment and Check

(1) Flange Back Adjustment

Object	See Fig. 9-28.
Measurement point	AF microcomputer data reader jig Adjustment remote control
Measuring instrument	
Adjustment page	F
Adjustment address	EB (MODE) E9 (ADJUST MODE)
Specified value	The adjustment remote control must indicate adjustment address 3B.

Note : The following object should be used (A0 size 1189×841mm)



Size of A0

The border between black and white parts should be sharp. Also, there should be no background except for this chart at the extreme end of WIDE.

Fig. 9-28.

[Adjustment Method]

1) Place the specified object in the center of the screen 2 meters±5mm apart from the front of the lens.
2) Make sure that the change between white and black is not deviated from the center of the screen even at the extreme end of TELE.
3) Press the SHUTTER SPEED button and set the speed to 1/120 shutter.
4) Select adjustment page 5, adjustment address 00 and adjustment data F0 with the adjustment remote control.
5) Select adjustment page F, adjustment address EB and adjustment data F9 with the adjustment remote control. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
6) Attach an appropriate ND filter on the whole lens depending on the quantity of light so that the indicated value of AF microcomputer reader jig is A0 or less.
7) Select adjustment address EB and adjustment data 22 with the adjustment remote control.
8) Set to adjustment address E9 and adjustment data 0F with the adjustment remote control. (This permits automatic adjustment.)
9) After this setting, check that 3B will be displayed at adjustment address on the adjustment remote control for 12 to 18 seconds.
10) After this check, remove the ND filter on the lens.
11) Select adjustment address EB and adjustment data 00 with the adjustment remote control.
12) Select adjustment address E9 and adjustment data 00 with the adjustment remote control.
13) Turn the main power OFF.

(2) Flange Back Check

Object	Siemens star chart
Measurement point	VIDEO OUT terminal of the video block
Measuring instrument	Monitor
Specified value	The siemens start must be in focus during zooming. In case of NG: Step difference±3 steps max

[Checking Method]

1) Place siemens start chart 2m apart from the front of the lens.
2) Select adjustment page 5, adjustment address 00 and adjustment data 10 with the adjustment remote control.
3) Open the IRIS.
4) Press the FOCUS button and set to Manual.
5) Pick up the image of the siemens start at the extreme end of TELE.
6) Turn the FOCUS RING to focus on the center position.
7) Check that the siemens star chart is in focus when zooming to the extreme end of WIDE. If NG, perform Steps 8) to 11) given below.
8) If NG, memorize the focus steps at the extreme end of WIDE.
9) Pick up image at the extreme end of WIDE.
10) Turn the FOCUS RING to focus on the center position.
11) Check that the focus steps observed at this time are different from the steps memorized above within ±3 steps.
12) After this check, select adjustment page F and adjustment address 56 with the adjustment remote control and check that the adjustment data is 00. If the adjustment data is not 00, set the data to 00. Then, press the PAUSE button on the adjustment remote control to store the adjustment data.

9-3-21. Hall Adjustment (VC-106 Board)

Object	White patter standard frame All black (Put a black cap on the lens.)
Measurement point	CN251
Measuring instrument	AF microcomputer data reader jig
Adjustment page	F
Adjustment address	1B (HALL GAIN) 1C (HALL OFFEST)
Specified value	White pattern imaging: B8±02 All black imaging: 03±03 (However, 00 is considered NG.)

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select the adjustment page F with the adjustment remote control.
3) Set the adjustment address to EB and the adjustment data to 05 with the adjustment remote control.
4) Press the PAUSE button on the adjustment remote control.
5) Set the adjustment address to 1B with the adjustment remote control.
   Pick up the image of all white pattern in the zoom position of color bar standard frame. Change the adjustment data and adjust so that the indicated value of AF microcomputer reader jig is B8±02. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
   Put a black cap on the lens and select all black imaging. Change the adjustment data and adjust so that the indicated value of AF microcomputer reader jig is 03±03 (however, 00 is considered NG). Press the PAUSE button on the adjustment remote control to store the adjustment data.
6) Set the adjustment address to 1C with the adjustment remote control.
   Pick up the image of all white pattern in the zoom position of color bar standard frame. Change the adjustment data and adjust so that the indicated value of the AF microcomputer reader jig is B8±02. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
   Put a black cap on the lens and select all black imaging. Change the adjustment data and adjust so that the indicated value of AF microcomputer reader jig is 03±03 (however, 00 is considered NG). Press the PAUSE button on the adjustment remote control to store the adjustment data.
7) Repeat Steps 5) and 6) alternately until the specification is met.
8) Set the adjustment address to EB and the adjustment data to 00 with the adjustment remote control.
9) Press the PAUSE button on the adjustment remote control to store the adjustment data.

9-3-22. Auto White Balance Adjustment (VC-106 Board)

Note 1: "Preset Adjustment" and "Auto White Balance Adjustment" should be always performed in this order.

1) Preset Adjustment (VC-106 Board)

Object	All white pattern
Adjustment page	F
Adjustment address	EE (AWB MODE1)

Note 1: Allow the set to be energized for more than 30 seconds before entering Preset Adjustment.

Note 2: When making "Preset Adjustment" again, turn the power OFF once and then ON again before retry.

[Adjustment Method]

1) Turn the power OFF once and then ON again.
2) Pick up the image of all white pattern for more than 5 seconds. (AF switch should be turned OFF.)
3) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
4) Select adjustment page F with the adjustment remote control.
5) Set the adjustment address to EE and the adjustment data to 01 with the adjustment remote control.
6) Press the PAUSE button on the adjustment remote control (3200K Data Fetch 1).
7) Set the adjustment address to EE and the adjustment data to 01 with the adjustment remote control.
8) Press the PAUSE button on the adjustment remote control (3200K Data Fetch 2).
9) Check that the LANC data is changed and that adjustment address 95 is selected.
10) Set the adjustment address to EE and the adjustment data to 00 with the adjustment remote control.
11) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
12) Perform "Auto White Balance Adjustment."

(2) Auto White Balance Adjustment (VC-106 Board)

Note 1 : This adjustment assumes that "Preset Adjustment" has been previously completed.

Object	All white pattern
Filter	Color temperature compensation filter C14 (C12+C2)
Measuring instrument	Vectorscope
Measurement point	VIDEO OUT terminal
Adjustment page	F
Adjustment address	01 (R CONT) 02 (B CONT)
Specified value	The white bright point must coincide with the origin.

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Cover the lens with the C14 filter.
3) Select adjustment page F with the adjustment remote control.
4) Select adjustment address EE (AWB MODE1) and set the adjustment data to D0 (WB DIRECT setting) with the adjustment remote control. Press the PAUSE button adjustment remote control in order to store the adjustment data.
5) Change the adjustment data at adjustment addresses 01 and 02 and adjust so that the white bright point coincides with the origin. Press the PAUSE button on the adjustment remote control to store the adjustment data,
6) Select adjustment address EE and set the adjustment data to 00.
7) Press the PAUSE button on the adjustment remote control to store the adjustment data.

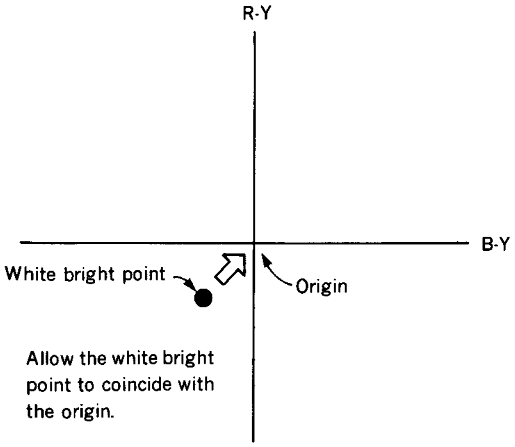


Fig. 9-29.

9-3-23. Manual Gain Reference Setting (VC-106 Board)

Object	Color bar chart standard picture frame
Measurement point	CN251
Measuring instrument	AF microcomputer data reader jig
Adjustment page	F
Adjustment address	64 (GAIN REF)

[Adjustment Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address EB and adjustment data 0B with the adjustment remote control.
4) At this time, input the indicated vale of AF microcomputer reader jig to at address 64. Press the PAUSE button in order to store the adjustment data.
5) Select adjustment address EB and adjustment data 00.
6) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

9-3-24. Manual Iris Data Adjustment (VC-106 Board)

Object	White pattern standard picture frame
Measurement point	CN251
Measuring instrument	AF microcomputer data reader jig
Adjustment page	F
Adjustment address	63 (M IRIS REF)
Specified value	B8±02

[Adjustment Method]

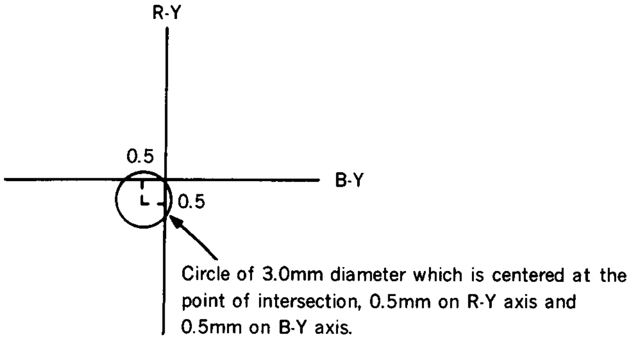
1) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
2) Select adjustment page F with the adjustment remote control.
3) Select adjustment address EB and adjustment data 05 with the adjustment remote control.
4) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
5) Open the AUTO LOCK cover.
6) Press the EXPOSURE button and set to Brightness mode.
   Use the EXPOSURE control dial to set to the 6th position from the bottom. (The first position is to be selected when the Iris is closed.)
7) Change the adjustment data at adjustment address 63 and adjust so that the indicated vale of AF microcomputer reader jig is B8±02. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
8) Select adjustment address EB and adjustment data 00.
9) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

9-3-25. Outdoor White Balance Check

Object	All white pattern standard frame
Filter	Color temperature compensation filter C14 (C12+C2)
Measurement point	VIDEO OUT terminal of the video block
Measuring instrument	Vectorscope
Specified value	See Fig. 9-30.

[Checking Method]

1) Press the WHITE BALANCE button and set to Outdoor White Balance mode.
   (The mark ☼ will appear on the EVF screen or monitor screen (when the data screen is turned ON.).)
2) Check that the center of the white bright point is within the circle of 3.5mm diameter given in Fig. 9-30.



Circle of 3.0mm diameter which is centered at the point of intersection, 0.5mm on R-Y axis and 0.5mm on B-Y axis.

Fig. 9-30.

9-3-26. Auto Focus Check (VC-106 Board)

Object	Color bar chart standard picture frame
Measurement point	CN251
Measuring instrument	AF microcomputer reader jig
Adjustment page	F
Adjustment address	EB (MODE) 5D (JIG 1 PAGE) 40 (JIG 0)
Specified value	FA>60 FA/FH=3 or 4

[Checking Method]

1) Press the FOCUS button and turn the Auto Focus ON.
2) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
3) Select adjustment page F, adjustment address EB and adjustment data F9 with the adjustment remote control. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
4) Check that the indicated value (FA) of AF microcomputer reader jig is more than 60 (FA>60).
5) After this check, set the adjustment data at adjustment address EB to 21. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
6) Select adjustment address 5D and adjustment data 00 with the adjustment remote control. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
7) Select adjustment address 40 and adjustment data D4 with the adjustment remote control. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
8) Check that the indicated value (FA/FH) of AF microcomputer reader jig is 3 or 4 (FA/FH=3 or 4).
9) After this check, set to adjustment address EB and adjustment data 00.
10) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

9-3-27. Brightness Correction Check (VC-106 Board)

Object	All white pattern All black (Cover the lens with a black cap.)
Measurement point	CN251
Measuring instrument	AF microcomputer reader jig
Adjustment page	F
Adjustment address	EB (MODE)
Specified value	All white and all black : B8±03 Resetting : 04±03

[Checking Method]

1) Take a picture of all white pattern and set the EXPOSURE button to ON.
2) Select adjustment page 5, adjustment address 00 and adjustment data 80 with the adjustment remote control.
3) Select adjustment page F, adjustment address EB and adjustment data 05 with the adjustment remote control. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
4) Check that the indicated value of AF microcomputer reader jig is B8±03.
5) Make all black imaging (Cover the lens with a black cap).
6) Check that the indicated value of AF microcomputer reader jig is still B8±03.
7) Set the EXPOSURE button to OFF and then to ON again.
8) Check that the indicated value of AF microcomputer reader jig is 04±03. Also, check that the EVF brightness indication is at the top.
9) Set to adjustment address EB and adjustment data 00 with the adjustment remote control.
10) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

9-3-28. Digital Titler Picture Quality Check

Mode	Camera Stand-by
Object	All black (Cover the lens with a black cap.)
Measurement point	VIDEO OUT terminal
Measuring instrument	Vectorscope
Specified value	Mg (Magenta) must be within the specified frame. (Check that each of the other colors is within the specified frame.

[Checking Method]

1) Select adjustment page 5, adjustment address 00 and adjustment data 10 with the adjustment remote control.
2) Make all black imaging (Cover the lens with a black cap).
3) Press the MEMORY button.
4) Press the SUPERIMPOSE ON/OFF button to display the title.
5) Press the COLOR/MODE button to select Mg (Magenta).
6) At this time, check that Magenta is within the specified frame.
7) Check that each of the other colors is within the specified frame.

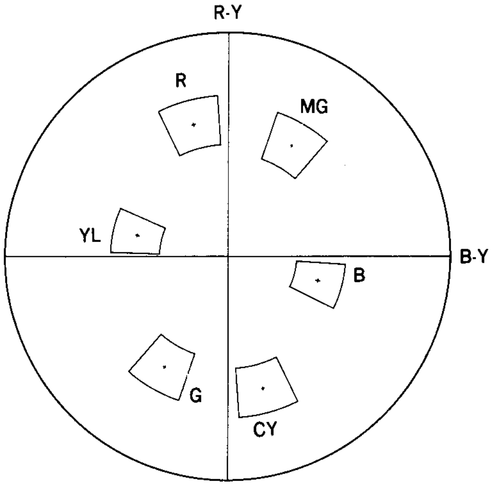


Fig. 9-31.

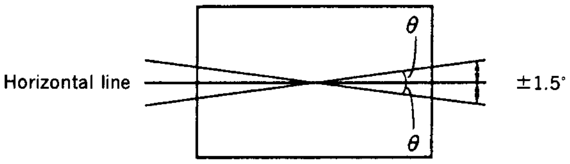
9-4. ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENTS

9-4-1. Horizontal Tilt Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Specified value	See Fig. 9-32

[Adjustment Method]

1) Adjust optimum brightness on the CRT with RV954 (BRIGHT).
2) Loosen the DY (deflection yoke) tightening nut.
3) Make the picture horizontal by rotating DY.
4) Retighten the DY tightening nut.
(Do not tighten excessively.)



Specified value: Image orientation to be within ±1.5° of horizontal line.

Fig. 9-32.

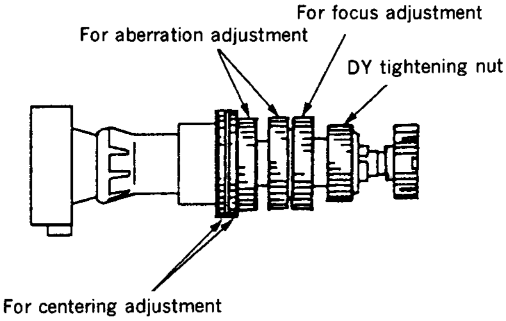


Fig. 9-33.

9-4-2. Centering Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Specified value	See Fig. 9-34.

[Adjustment Method]

1) Turn the centering adjustment rings to make the margin even at right, left, upper and lower of the screen. (See Fig. 9-33.)

Note : Since the centering position is affected by the earth magnetism, turn the equipment over 360° horizontally, and make adjustment at the orientation that exhibits median displacements of the image.

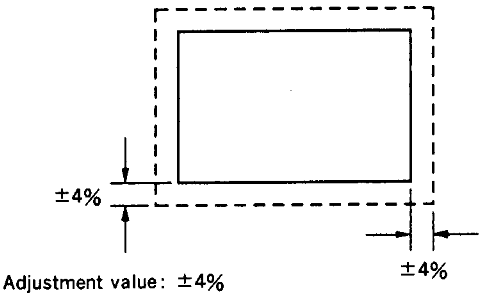


Fig. 9-34.

9-4-3. Focus Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion

[Adjustment Method]

1) Adjust for optimum focus using the focus ring. (See Fig. 9-33.)

9-4-4. Aberration Adjustment

Mode	E-E
Signal	Dot pattern
Specified value	See Fig. 9-35.

[Adjustment Method]

1) Use the aberration adjustment rings to adjust any trailing dots to under 2 times the dot diameter and any fan shaped aberrations to within the dot diameter.
2) If off center, repeat the "Centering Adjustment".

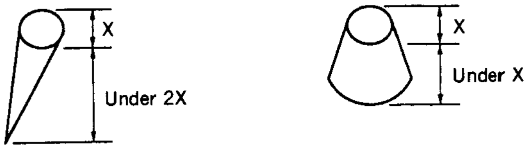


Fig. 9-35.

9-4-5. Horizontal Oscillation Frequency Adjustment (VF-40P Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP)
Measurement point	Positive terminal of C954
Measuring instrument	Digital voltmeter or oscilloscope (DC range)
Adjustment element	RV951
Specified value	2.60±0.05Vdc

[Adjustment Method]

1) Adjust RV951 to 2.60±0.05Vdc.

9-4-6. Horizontal Amplitude Adjustment (VF-40P Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Adjustment element	C961
Specified value	6±2%

[Adjustment Method]

1) By turning RV952, align upper and lower edges of the monoscope image with those of the screen.
2) By turning RV954, attain a normal brightness level.
3) To achieve 6±2% horizontal overscans (right and left total), short-circuit or open the pattern (A) for H size adjustment capacitor (C961). (See Fig. 9-37.)

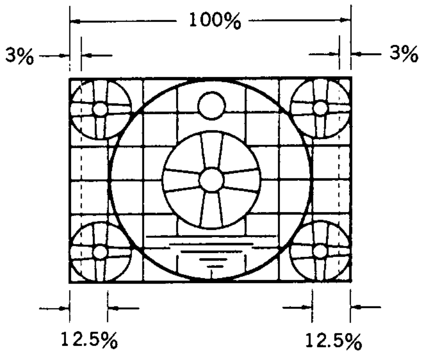
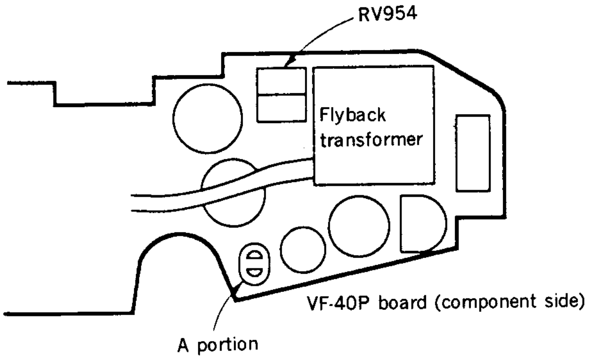


Fig. 9-36.



A section	H size
Open	Small
Short	Large

Fig. 9-37.

9-4-7. Vertical Amplitude Adjustment (VF-40P Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Adjustment element	RV952
Specified value	5±2%

[Adjustment Method]

1) By turning RV952, adjust for 5±2% (upper and lower total) vertical overscan.

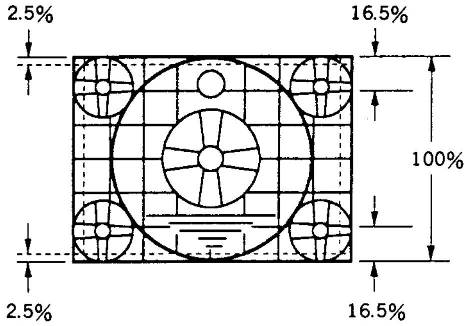


Fig. 9-38.

9-4-8. Brightness, Contrast Adjustments (VF-40P Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5CSP) Monoscope portion
Adjustment element	Brightness: RV954 Contrast: RV953

[Adjustment Method]

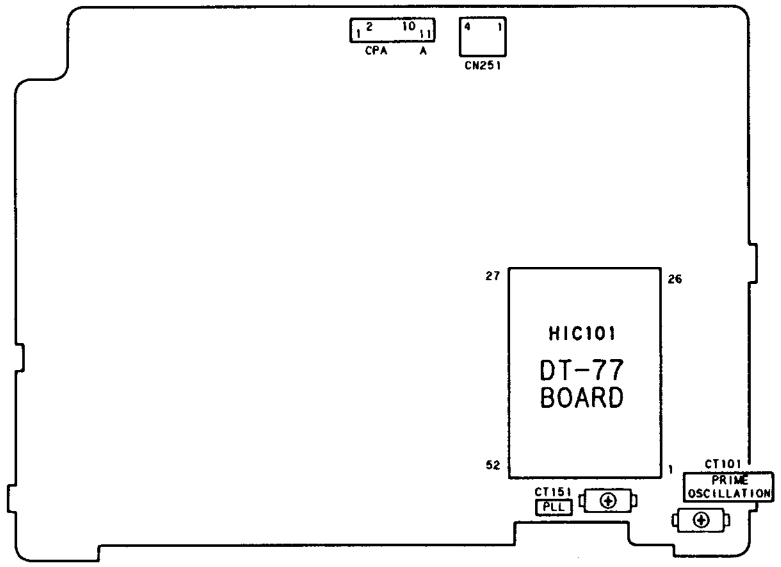
1) Turn RV954 and RV953 alternately until the bright and dark areas of a gray scale are displayed correctly. (The bright areas should not made too bright to avoid a fuzzy display of the cross-hatches in the monoscope circle, and the brightness of the dark areas should be such that discrimination between the darkest and second darkest area is possible.)

9-4-9. Horizontal Amplitude, Vertical Amplitude and Focus Checks

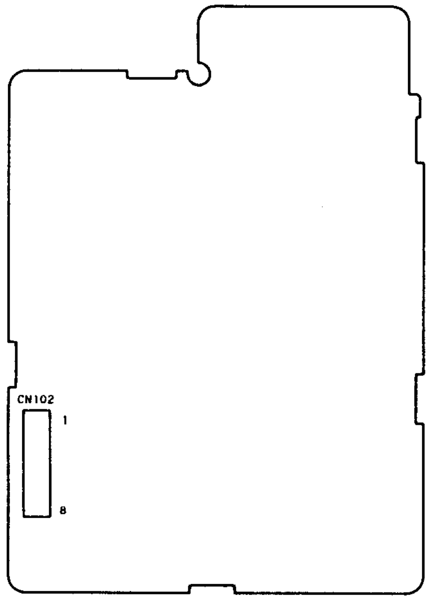
Values should conform to specifications given in "9-4-6. Horizontal Amplitude Adjustment" and "9-4-7. Vertical Amplitude Adjustment". If not, readjust accordingly, and repeat "9-4-8. Brightness, Contrast Adjustments". In this case, focus needs to be checked. If the image is not clear, perform "9-4-3. Focus Adjustment" and "9-4-4. Aberration Adjustment".

9-5. ADJUSTING PART LOCATION DIAGRAM

VC-106 BOARD(COMPONENT SIDE)


1
2
10
11
CPA
A
4
1
CN251
27
26
HIC101
DT-77
BOARD
52
1
CT101
PRIME
OSCILLATION
CT151
PLL

DD-33P BOARD
(COMPONENT SIDE)



SECTION 10
VIDEO SYSTEM ADJUSTMENTS

See the adjusting part location diagram from on page 282 for the adjustment

10-1. PREPARATION FOR ADJUSTMENT
10-1-1. Equipment Required

The following measuring instruments are used for adjustment of the VTR block.

1) Monitor TV
2) Dual-trace oscilloscope, band width of 30MHz or more, with delay mode (use a probe 10 : 1, unless otherwise specified)
3) Frequency counter
4) Pattern generator (with video output terminal ; refer to 5-1-3 "Equipment Connection")
5) Digital voltmeter
6) Audio generator
7) Auido level meter
8) Audio distortion meter
9) Audio attenuator
10) Stabilized power supply
11) Alignment tape
    - For tracking adjustment
      (WR5-1CP) Part No.: 8-967-995-07
    - For video frequency characteristic adjustment
      (WR5-7CE) Part No.: 8-967-995-18
    - For L mode operation check
        - For SP (WR5-5CSP) Part No.: 8-967-995-46
          (WR5-4CSP) Part No.: 8-967-995-47
        - For LP (WR5-4CL) Part No.: 8-967-995-56
    - For E mode operation check (ME tape)
        - For SP (WR5-8CSE) Part No.: 8-967-995-48
        - For LP (WR5-8CLE) Part No.: 8-967-995-57
    - For audio adjustment
      (WR5-9CS) Part No.: 8-967-995-28

10-1-2. Precautions for Adjustment

"Playback Frequency Characteristic Adjustment" of the Video System Adjustment should be always performed with the VC-106 board removed. When removing the VC-106 board, the following three flexible harnesses (four connectors) should be removed.

1. FP-379 Flexible (Two connectors)
2. FP-380 Flexible
3. FP-383 Flexible

The VC-106 board should be installed for performing the other adjustments for the VTR block.

10-1-3. Equipment Connection

Connect the measuring instruments as shown in Fig. 10-1 in accordance with indication of an input terminal (S VIDEO or VIDEO), and shift the CAMERA/VTR switch to VTR to make adjustment. The input terminal is specified in parentheses at the signal blank. When not specified, either input terminal may be used. The S VIDEO IN terminal has priority. When making adjustment with VIDEO IN terminal input, pull out a connector from the S VIDEO IN terminal.

Note 1 : When VIDEO input is used for adjustment where S VIDEO input is specified, the specifications of this equipment may not be satisfied. Be sure to follow instructions.

Note 2 : When adjustment is made using the VTR with S VIDEO output terminal as a signal source, the performance of this equipment is affected by that VTR. Use the pattern generator with Y/C separator output terminal as much as possible.

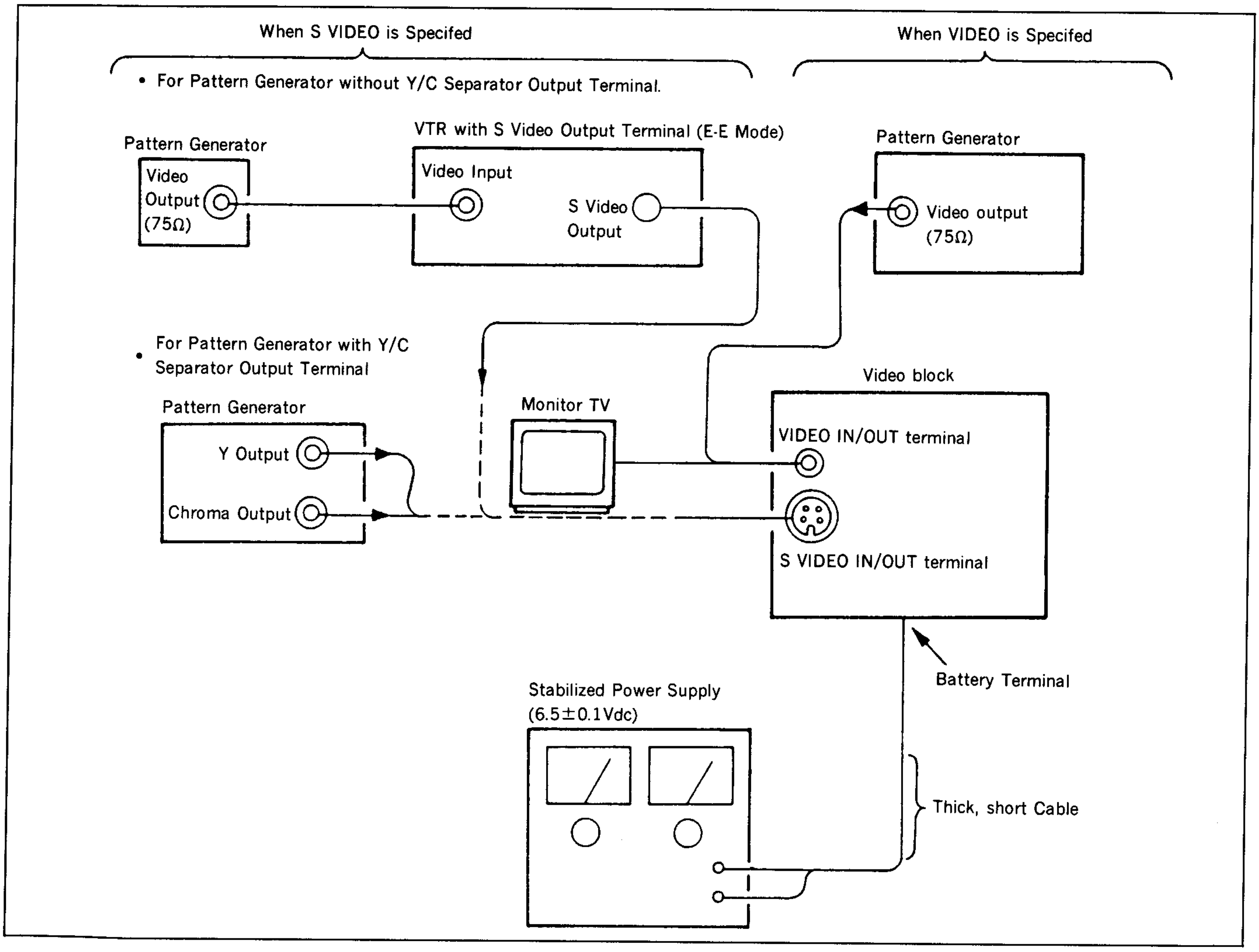

When S VIDEO is Specifed
• For Pattern Generator without Y/C Separator Output Terminal.
Pattern Generator
Video Output (75Ω)
VTR with S Video Output Terminal (E-E Mode)
Video Input
S Video Output
When VIDEO is Specifed
Pattern Generator
Video output (75Ω)
• For Pattern Generator with Y/C Separator Output Terminal
Pattern Generator
Y Output
Chroma Output
Monitor TV
Video block
VIDEO IN/OUT terminal
S VIDEO IN/OUT terminal
Battery Terminal
Stabilized Power Supply (6.5±0.1Vdc)
Thick, short Cable

Fig. 10-1

10-1-4. Input Signal Check

Video signals from the pattern generator are used as adjustment signals for adjustment of the VTR block. These video output signals should be within the required standard.

1) **For S VIDEO input**

   Connect an oscilloscope to the Y signal terminal of the S VIDEO IN terminal and check that a Y signal sync. signal has an amplitude of about 0.3 Vp-p, and an image amplitude is about 0.7 Vp-p. (When the VTR with S VIDEO OUT terminal is used, check also that neither chroma signal nor burst signal is remaining.) Also, connect the oscilloscope to the chroma signal terminal of the S VIDEO IN terminal and check that the burst signal for the chroma signal has a flat amplitude of about 0.3 Vp-p, and that a burst signal vs. chroma signal amplitude ratio is 0.30 : 0.66. Fig. 10-2 shows the Y and chroma signals used for adjustment.

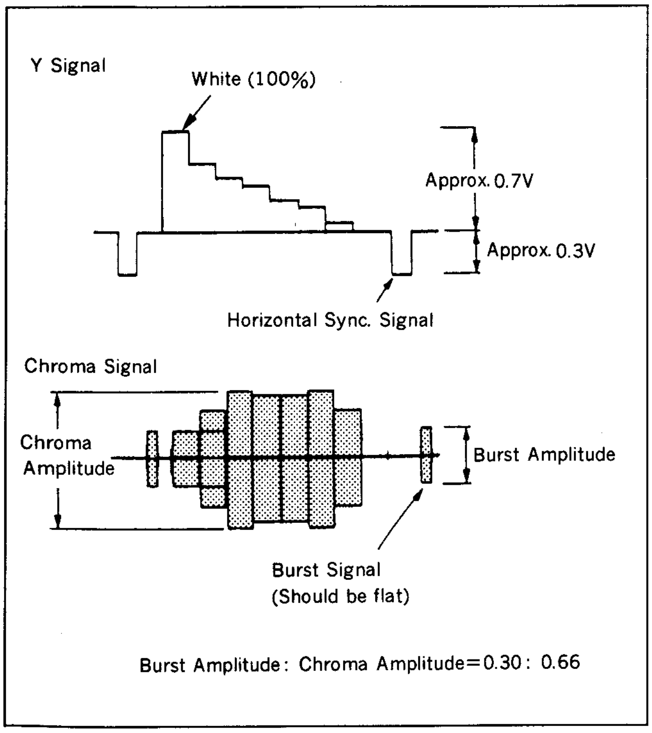

Y Signal
White (100%)
Approx. 0.7V
Approx. 0.3V
Horizontal Sync. Signal
Chroma Signal
Chroma Amplitude
Burst Amplitude
Burst Signal (Should be flat)
Burst Amplitude : Chroma Amplitude=0.30 : 0.66

Fig. 10-2. Pattern Generator Color Bar Signals

2) **For VIDEO input**

   Connect the oscilloscope to the VIDEO IN terminal and check that a video signal sync. signal amplitude is approx. 0.3V, image amplitude approx. 0.7V, and burst signal amplitude approx. 0.3V and flat, respectively, and that a burst signal vs. "red" signal level ratio is 0.30 : 0.66.

   The video signal (color bar) used for the VTR block adjustment is shown in Fig. 10-3.

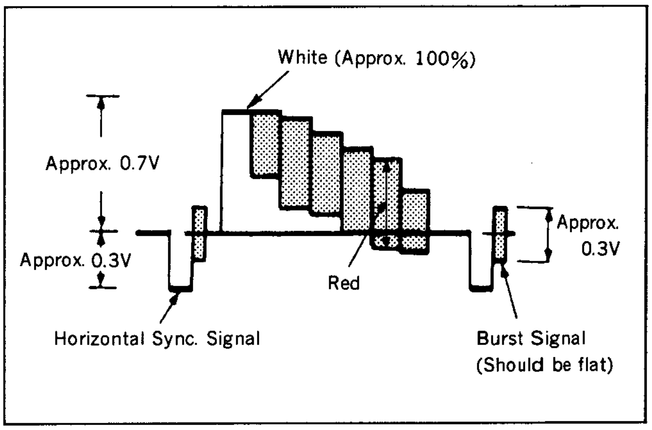

White (Approx. 100%)
Approx. 0.7V
Approx. 0.3V
Red
Approx. 0.3V
Horizontal Sync. Signal
Burst Signal (Should be flat)

Fig. 10-3. Pattern Generator Color Bar Signal

10-1-5. Alignment Tape

The following alignment tapes are provided. Use the alignment tape specified in the signal blank for each adjustment. When using the operation checking tape for adjustment and no type is specified, you can use any operation checking tape.

Tape	Recording Mode	Tape Type	Tape Speed	Recording content		Use
				Video Area	PCM Area (Audio)	
Tracking WR5-1CP	L	MP	SP	CH2 : 1 MHz tape path adjustment signal, Switching position adjustment marker (CH1 : 9MHz)		Tape path adjustment, Switching position adjustment
Video frequency characteristic WR5-7CE	E	ME	LP	RF sweep 0~15MHz Marker 2, 4.5, 7,8.5, 10MHz		Frequency characteristic adjustment
Operation checking WR5-4CSP or WR5-5CSP	L	MP	SP	• Video signal Color bar : 4min. Monoscope : 4min. • Audio signal (AFM) 400Hz, 60%modulation	Monoscope portion 20Hz, 20sec. 400Hz,20sec. 14kHz,20sec. Repeat 4 times Color bar portion 1kHz, 4min.	Operation checking
WR5-8CSE	E	ME	SP		400Hz, 8min	
WR5-4CL	L	MP	LP	• Video signal Color bar : 4 min. Monoscope : 4 min. • Audio signal (AFM) 400Hz 60% modulation		
WR5-3CL	L	MP	LP	• Video signal Color bar : 4min. Monoscope : 4min. • Audio signal (AFM) 400Hz, 60%modulation		
WR5-8CLE	E	ME	LP		400Hz, 8min	
AFM stereo checking operation WR5-9CS	L	MP	SP	• Video signal Color bar : 4 min. 400Hz 8min. • Audio signal (AFM) • Color bar part Lch : 400Hz L+R (1.5MHz±60kHz) Rch : 1kHz L−R (1.7MHz±30kHz) • Monoscope part DEV+Bilingual (Including a RF ID signal.)	• Audio signal (PCM) 400Hz 8min.	AFM stereo PB matrix adjustment

Note : Recording modes

L .... Conventional mode
E .... hi8 (high band) mode

Tape types

MP .... Coated metal tape
ME .... Evaporated metal tape

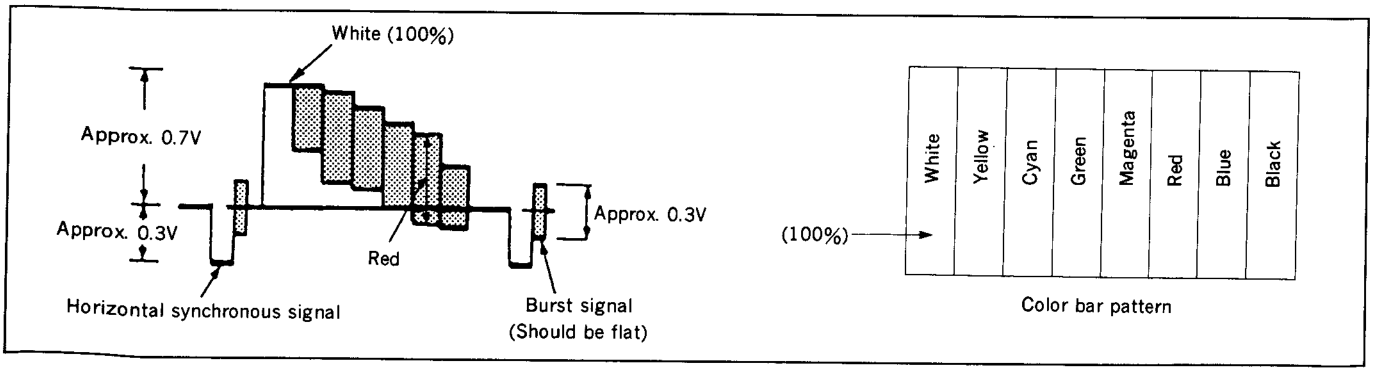

White (100%)
Approx. 0.7V
Approx. 0.3V
Red
Approx. 0.3V
Horizontal synchronous signal
Burst signal
(Should be flat)
(100%)
White
Yellow
Cyan
Green
Magenta
Red
Blue
Black
Color bar pattern

Fig 10-4. Alignment Tape Color Bar Signal

10-1-6. Input/Output Level and Impedance

S video input/output
4-pin mini DIN
Luminance signal : 1 Vp-p, 75 ohms, unbalanced, sync negative
Chrominance signal : 0.300 Vp-p, 75 ohms, unbalanced,

Video input/output
Phono jack, 1 Vp-p, 75 ohms, unbalanced, sync negative

Audio input/output
Phono jacks, (2 : stereo L and R)
Input : −7.5 dBs, input impedance more than 47 kilohms
Output : −7.5 dBs, (at output impedance 47 kilohms) impedance less than 2.2 kilohms

10-1-7. Recording Mode (E Mode/L Mode) Changeover

The recording mode (E mode/L mode) of this unit is changed over as listed below. Note that the playback mode (E mode/L mode) is automatically changed over depending on the recording mode for the tape to be played back.

Hi8 switch (L mode/E mode changeover switch)	Tape used	Record mode
AUTO (E mode)	ME	E
	MPHG	
	MP	L
OFF (L mode)	ME	L
	MPHG	
	MP	

(The recording mode only depends on the position of the Hi8 switch and the tape used.)

〔VTR Recording Procedure for AEP, UK Model〕

1. Insert the adjustment remote control RM-95 (J-6082-053-B) into the REMOTE jack.
2. Set the adjustment remote control to HOLD ON.
3. Select adjustment page 4, adjustment address C1 and adjustment data 41, and select adjustment page 4, adjustment address 29 and adjustment data 6□ with the adjustment remote control. (When the power is turned OFF, the system will return to the original state.)
4. Select adjustment page 0, adjustment address 01 and adjustment data 01 with the adjustment remote control.
5. Select adjustment page D, adjustment address 05 and adjustment data 91 with the adjustment remote control.
6. Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
7. Set the adjustment remote control to HOLD OFF.
(Now, VTR recording can be started.)

Note 1 : After recording has been done, be sure to turn the power OFF and then ON again to play back the record.

Note 2 : To clear REC mode, perform the above items 1, 2, 4, 5, 6 and 8. In this procedure, the adjustment data for item 6 should be set to 90.

Note 3 : When the data on page 4 has been changed, the SP/LP changeover and other switches will not be in force. Therefore, switch to a necessary mode before setting up necessary data.

10-2. POWER SUPPLY ADJUSTMENT AND CHECK

[Adjustment Sequence]

10-2-1. Frequency Adjustment
10-2-2. Video 5V Adjustment
10-2-3. Output Voltage Check

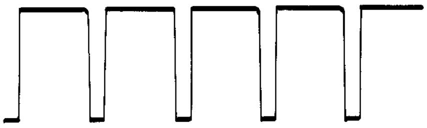
10-2-1. Frequency Adjustment (DD-33P Board)

Mode	Record
Signal	Arbitrary
Measurement point	Q201 collector (JL202)
Measuring instrument	Oscilloscope Frequency counter
Adjustment element	RV101
Specified value	475±5kHz

Note : This frequency counter should be connected through a buffer amplifier (oscilloscope, etc.) having a high impedance and a low capacitance.

[Adjustment Method]

1) Adjust RV101 to obtain the level 475±5kHz.



475±5kHz

Fig. 10-5.

10-2-2. Video 5V Adjustment (DD-33P Board)

Mode	Record
Signal	Arbitrary
Measurement point	Positive (+) side: CN103 pin ③ Negative (−) side: CN103 pin ① (REG GND) (JL204)
Measuring instrument	Digital voltmeter
Adjustment element	RV102
Specified value	4.92±0.01Vdc

[Adjustment Method]

1) Adjust RV102 to obtain the level 4.92±0.01Vdc.

10-2-3. Output Voltage Check (DD-33P Board)

Note : Pin ① of CN103 (REG GND) (JL204) should be used for grounding.

Mode	E-E
Measuring instrument	Digital voltmeter
SS 5V Check	
Measurement point	CN103 pin ⑦ (JL216)
Specified value	4.91±0.03Vdc
VIDEO 5V Check	
Measurement point	CN103 pin ③ (JL207)
Specified value	4.92±0.02Vdc
AUDIO 5V Check	
Measurement point	CN103 pin ⑥ (JL212)
Specified value	4.89±0.03Vdc
EVF 5V Check	
Measurement point	CN103 pin ④ (JL209)
Specified value	4.95±0.03Vdc
V_{EE} Check	
Measurement point	CN103 pin ⑤ (JL210)
Specified value	−3.95±0.10Vdc

[Checking Method]

1) Check that each of the power supply voltages meets its specified value.

10-3. SYSTEM CONTROL SYSTEM ADJUSTMENT

10-3-1. Battery Down Adjustment

Mode	CAMERA REC
Object	Arbitrary
Measurement point	Check on the LCD of the adjustment remote control.
Measuring instrument	
Adjustment page	D
Adjustment address	02

[Connection]

1) Connect a stabilized power supply and a digital voltmeter as shown in Fig. 5-6.

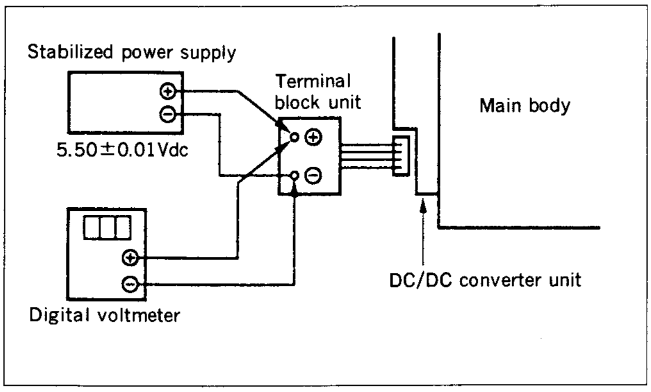


Fig. 10-6.

[Adjustment Method]

1) Connect the adjustment remote control to the REMOTE terminal (HL-4 board J501).
2) Place the POWER switch in the CAMERA position to set to CAMERA REC mode.
3) Place the HOLD switch on the adjustment remote control in the HOLD position (Service position).
4) Select adjustment page 0, adjustment address 00 and adjustment data 01 with the adjustment remote control (Emergency Inhibited and Protect Released). At this time, check that the voltage is 6.0Vdc or higher.
5) Set to adjustment address 02 with the remote control and make a note of the adjustment data (data A).
6) Select adjustment page D and adjustment address 02 with the remote control.
7) Input the data A noted in Step 5) into at adjustment address 02.
8) Press the PAUSE button on the remote control in order to store the adjustment data.

[Checking Method]

Perform the following checks. If any check is NG, perform the adjustment again.

1) Adjust the output voltage of the stabilized power supply so that the digital voltmeter indicates 5.65±0.01Vdc. (The VTR is in CAMERA REC mode.)
2) Check that mark is not illuminating on the EVF (Viewfinder) screen. (The TALLY lamp is lit.)
3) Reduce the output voltage of the stabilized power supply to such a level that the digital voltmeter indicates 5.53±0.01Vdc.
4) Check that mark and TALLY lamp on the EVF screen flashes at approximately 1 sec. intervals.
5) Reduce the output voltage of the stabilized power supply to such a level that the digital voltmeter indicates 5.47±0.01Vdc.
6) Check that mark and TALLY lamp on the EVF screen flashes at more frequent intervals and that the VTR is stopped and that the power is turned OFF.

10-4. SERVO SYSTEM ADJUSTMENT

[Adjustment Sequence]

10-4-1. Capstan FG Frequency Check
10-4-2. Capstan FG Offset Adjustment
10-4-3. Switching Position Adjustment

10-4-1. Capstan FG Frequency Check (VS-87 Board)

Mode	Record (SP) Playback (LP)
Signal	Arbitrary
Measurement point	IC605 pin ㉕ (FG OUT) (JL734)
Measuring instrument	Frequency counter Oscilloscope
Specified value	SP mode: 1145.5±1.0Hz LP mode: 574.7±1Hz

[Checking Method]

1) Set to Record mode. (SP mode)
2) Check that the capstan FG frequency is 1145.5±1.0Hz.
3) Set to Stop mode.
4) Select adjustment page 0, adjustment address 00 and adjustment data 01 with the adjustment remote control.
5) Place the EDIT switch in the EDIT ON position.
6) Set to Playback mode. (LP mode)
7) Check that the capstan FG frequency is 574.7±1Hz.
8) Select adjustment page 0 and adjustment address 00 and return the adjustment data to 00 with the adjustment remote control.

10-4-2. Capstan FG Offset Adjustment (VS-87 Board)

Mode	Record
Signal	Arbitrary
Measurement point	IC605 pin ㉕ (FG OUT) (JL734)
Measuring instrument	Oscilloscope
Adjustment page	D
Adjustment address	2B
Specified value	Duty 50±1%

[Adjustment Method]

1) Select adjustment page 0, adjustment address 00 and adjustment data 01 with the adjustment remote control.
2) Select adjustment page D and adjustment address 2B with the adjustment remote control.
3) Change the adjustment data with the adjustment remote control and adjust so that the CAP FG output waveform has a duty of 50±1%.
4) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

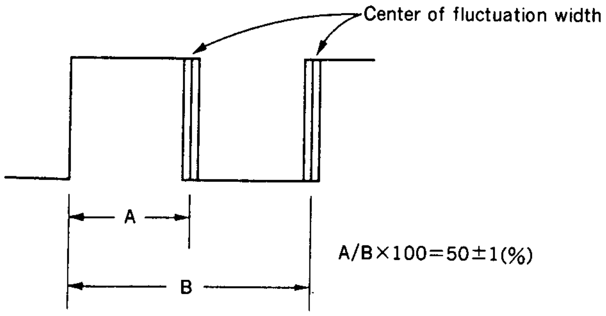


Fig. 10-7.

10-4-3. Switching Position Adjustment (VS-87 Board)

Mode	Playback
Signal	Alignment tape : for tracking adjustment (WR 5-1CP)
Measurement point	CH1 : CN002 pin ⑩ (RF SWP) CH2 : CN002 pin ⑪ (PB RF 2A) CN002 pin ⑫ (PB RF 2B)
Measuring instrument	Oscilloscope
Adjustment page	D
Adjustment address	04
Specified value	$t_1=0\pm10\mu sec$

[Adjustment Method]

1) Select adjustment page 0, adjustment address 00 and adjustment data 01 with the adjustment remote control.
2) Select adjustment page D and adjustment address 04 with the adjustment remote control.
3) Change the adjustment data with the adjustment remote control and adjust the waveform on CH2 so that $t_1=0\pm10\mu sec$.
4) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

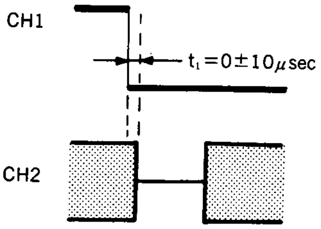


Fig. 10-8.

10-5. VIDEO SYSTEM ADJUSTMENT

It is expected that this Video System Adjustment be performed in the sequence that the adjustments are described. The color video signal supplied from the pattern generator is utilized as the video input signal for this Video System Adjustment in Record mode. Check that the signal meets the specifications given in Fig. 10-3 and in the "Input Signal Check".

[Adjustment Sequence]

10-5-1. Playback Frequency Characteristic Adjustment
10-5-2. X'tal Oscillator fo Check
10-5-3. SYNC AGC Adjustment
10-5-4. IR Adjustment
10-5-5. Chroma Comb Filter Adjustment (1)
10-5-6. Emphasis Input Level Adjustment
10-5-7. L Mode PB Y Level Adjustment
10-5-8. E Mode PB Y Level Adjustment
10-5-9. L Mode Y FM Deviation, Y FM Carrier Frequency Adjustment
10-5-10. E Mode Y FM Deviation, Y FM Carrier Frequency Adjustment
10-5-11. YD Adjustment
10-5-12. Chroma Emphasis Adjustment
10-5-13. Chroma Comb Filter Adjustment (2)
10-5-14. REC C RF Level Adjustment
10-5-15. Recording Current Adjustment
10-5-16. Y Level Adjustment
10-5-17. HUE Phase Deviation Adjustment
10-5-18. Titler PLL Adjustment
10-5-19. Character Generator Clock Adjustment

10-5-1. Playback Frequency Characteristic Adjustment (VS-87 Board)

Mode	Playback
Signal	Alignment tape: for frequency characteristic adjustment (WR5-7CE)
Measurement point	See Fig. 10-9.
Measuring instrument	Oscilloscope
Adjustment element	RV003 (1A) RV004 (1B) RV002 (2A) RV001 (2B)
Specified value	4.5MHz level: 8.5MHz level=3: 2

Note: The VC-106 board should be removed for this adjustment.

[Adjustment Method]

1) Adjust the respective RV adjustment elements so that for 1A, 1B, 2A and 2B PB RF output waveforms, the ratio of the 4.5MHz level to the 8.5MHz is 3: 2.

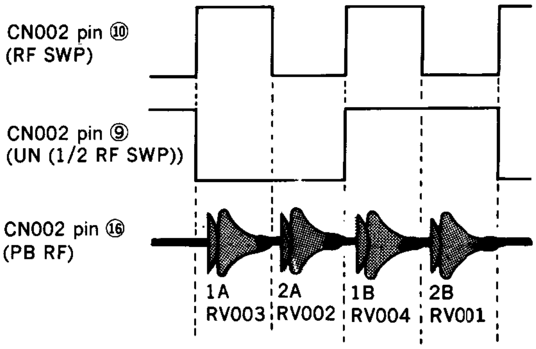


Fig. 10-9.

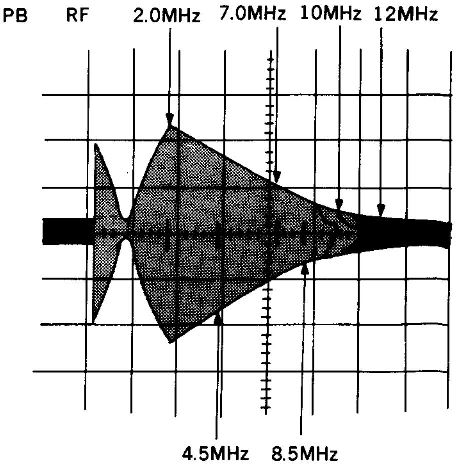


Fig. 10-10.

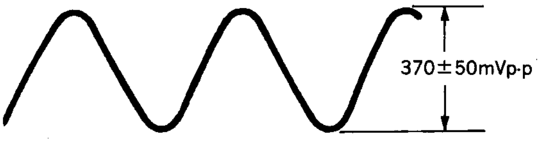
10-5-2. X'tal Oscillator fo Check (VC-106 Board)

Mode	Playback
Signal	Alignment tape for operational check
Measurement point	W401 pin ④ (FSC) (JL403)
Measuring instrument	Frequency counter Oscilloscope
Specified value	4433619±50Hz

Note : This frequency counter should be connected through a buffer amplifier (oscilloscope, etc.) having a high impedance and a low capacitance.

[Adjustment Method]

1) Check that the oscillation frequency at pin ④ of W401 is 4433619±50Hz.



(4433619±50Hz)

Fig. 10-11.

10-5-3. SYNC AGC Adjustment (VC-106 Board)

Mode	E-E
Signal	Color bar (S VIDEO)
Measurement point	W401 pin ⑧ (EE PB Y) (JL406)
Measuring instrument	Oscilloscope
Adjustment element	RV401
Specified value	490±10mVp-p

[Adjustment Method]

1) Adjust RV401 to obtain the level 490±10mVp-p.

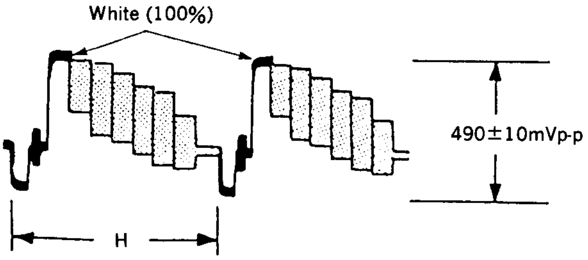


Fig. 10-12.

10-5-4. IR Adjustment (VC-106 Board)

Mode	E-E
Signal	Color bar (VIDEO)
Measurement point	IC401 pin ⑦ (Y COMB OUT) (JL438)
Measuring instrument	Oscilloscope
Adjustment element	RV408
Specified value	Minimize red residual chroma component (40mVp-p or less).

[Adjustment Method]

1) Adjust RV408 so that the red residual chroma component is minimized (40mVp-p or less).

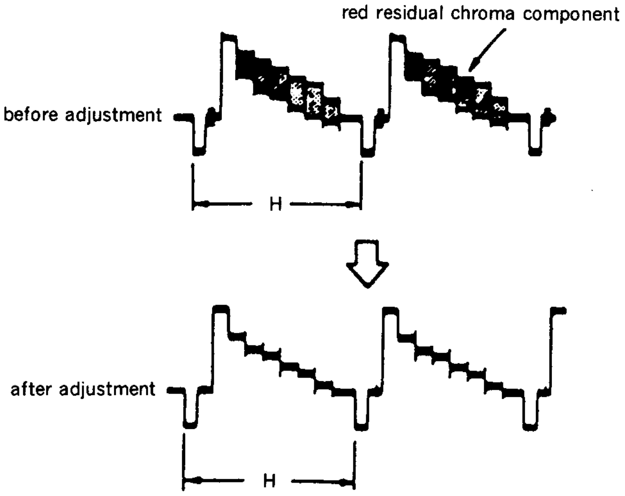


Fig. 10-13.

10-5-5. Chroma Comb Filter Adjustment (1) (VC-106 Board)

Mode	E-E
Signal	Color bar (VIDEO)
Measurement point	IC401 pin ⑪ (C+CD) (JL437)
Measuring instrument	Oscilloscope
Adjustment element	RV402 RV551
Specified value	Minimize red residual chroma component (12mVp-p or less).

[Adjustment Method]

1) Adjust RV402 and RV551 alternately so that the red residual chroma component is minimized (12mVp-p or less).

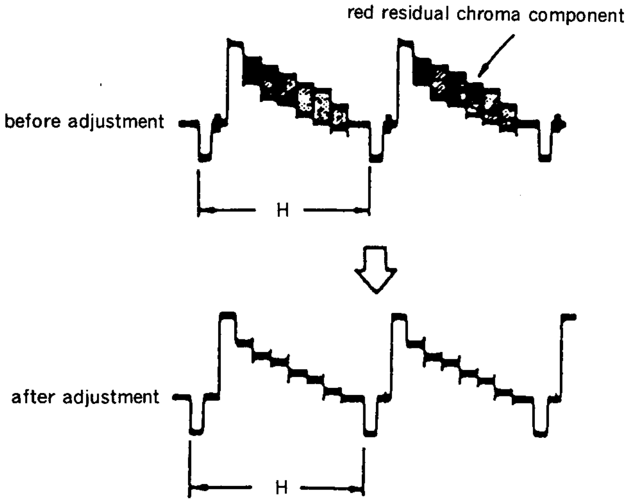

red residual chroma component
before adjustment
H
after adjustment
H

Fig. 10-14.

10-5-6. Emphasis Input Level Adjustment (VC-106 Board)

Mode	E-E
Signal	Color bar (S VIDEO)
Measurement point	Q420 emitter (JL441)
Measuring instrument	Oscilloscope
Adjustment element	RV409
Specified value	500±10mVp-p

[Adjustment Method]

1) Adjust RV409 to obtain the level 500±10mVp-p.

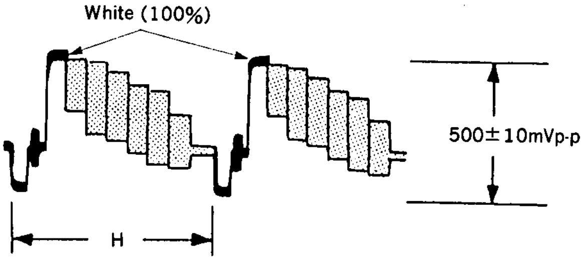

White (100%)
500±10mVp-p
H

Fig. 10-15.

10-5-7. L Mode PB Y Level Adjustment (VC-106 Board)

Mode	Playback
Signal	Alignment tape: for operational check (WR5-4CSP or WR5-5CSP) color bar portion
Measurement point	W401 pin ⑧ (EE PB Y) (JL406)
Measuring instrument	Oscilloscope
Adjustment element	RV411
Specified value	490±10mVp-p

[Adjustment Method]

1) Adjust RV411 to obtain the level 490±10mVp-p.

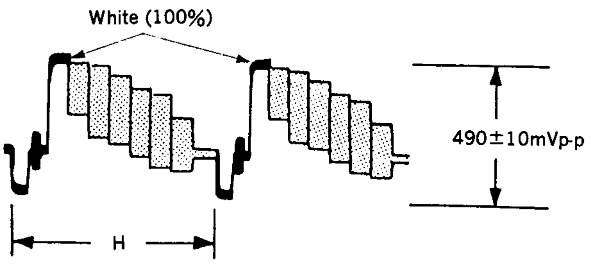


Fig. 10-16.

10-5-8. E Mode PB Y Level Adjustment (VC-106 Board)

Mode	Playback
Signal	Alignment tape: for operational check (WR5-8CSE) color bar portion
Measurement point	W401 pin ⑧ (EE PB Y) (JL406)
Measuring instrument	Oscilloscope
Adjustment element	RV410
Specified value	490±10mVp-p

[Adjustment Method]

1) Adjust RV410 to obtain the level 490±10mVp-p.

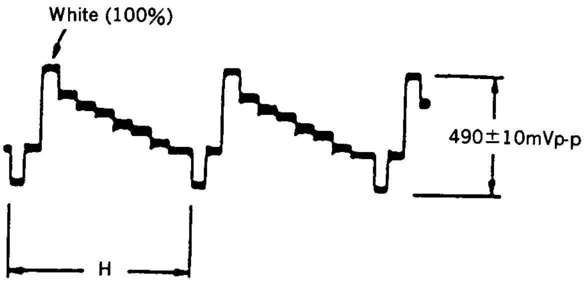


Fig. 10-17.

10-5-9. L Mode Y FM Deviation, Y FM Carrier Frequency Adjustment

Note : After this adjustment, "10-5-10. E Mode Y FM Deviation, Y FM Carrier Frequency Adjustment" should be always performed.

(1) L Mode Y FM Deviation Adjustment (VC-106 Board)

Mode	Record and Playback
Signal	Color bar (S VIDEO)
Measurement point	W401 pin ⑧ (EE PB Y) (JL406)
Measuring instrument	Oscilloscope
Adjustment element	RV404
Specified value	Playback level of 490±15mVp-p

Note : This adjustment assumes that "L Mode PB Y Level Adjustment" has been already completed.

[Adjustment Method]

1) Set an MP type cassette tape.
2) Record the color bar signal.
3) Play back the recorded signal.
4) Check the playback output level.
   Specification : 490±15mVp-p
5) If the specification is not met, turn RV404 as specified below and then repeat Steps 1) to 3).

	Direction of turning RV404
If larger than specified value	Counterclockwise (↺)
If smaller than specified value	Clockwise (↻)

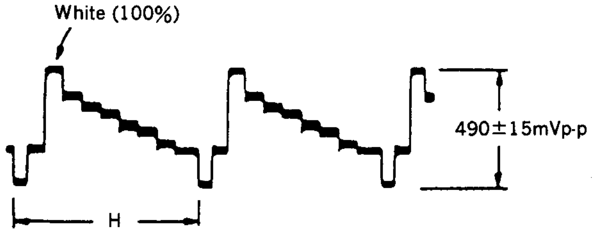


Fig. 10-18.

(2) L Mode Y FM Carrier Frequency Adjustment (VC-106 Board)

Mode	E-E
Signal	No signal
Measurement point	W401 pin ㊱ (Y RF) (JL428)
Measuring instrument	Frequency counter Oscilloscope
Adjustment element	RV407
Specified value	4.37±0.04MHz

Note : This frequency counter should be connected through a buffer amplifier (oscilloscope, etc.) having a high impedance and a low capacitance.

[Adjustment Method]

1) Set an MP type cassette tape.
2) Adjust RV407 to obtain the level 4.37±0.04MHz.

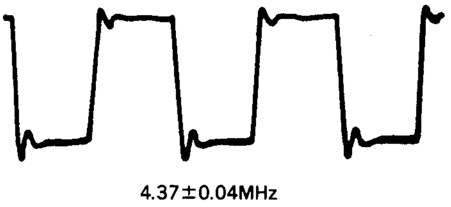


Fig. 10-19.

10-5-10. E Mode Y FM Deviation, Y FM Carrier Frequency Adjustment

Note 1 : This adjustment assumes that "10-5-9. L Mode Y FM Deviation, Y FM Carrier Frequency Adjustment" has been already completed.

Note 2 : The following check should be performed before entering this adjustment :

1. Check to ensure that a connector is inserted into the S VIDEO IN/OUT terminal (also when no signal is applied).

(1) E Mode Y FM Deviation Adjustment (VC-106 Board)

Mode	Record and Playback
Signal	Color bar (S VIDEO)
Measurement point	W401 pin ⑧ (EE PB Y) (JL406)
Measuring instrument	Oscilloscope
Adjustment element	RV405
Specified value	Playback level of 490±15mVp-p

Note : This adjustment assumes that "E Mode PB Y Level Adjustment" has been already completed.

[Adjustment Method]

1) Set an ME type cassette tape.
2) Record the color bar signal.
3) Play back the recorded signal.
4) Check the playback output level.
   Specification : 490±15mVp-p
5) If the specification is not met, turn RV405 as specified below and then repeat Steps 1) to 3).

	Direction of turning RV405
If larger than specified value	Counterclockwise (↺)
If smaller than specified value	Clockwise (↻)

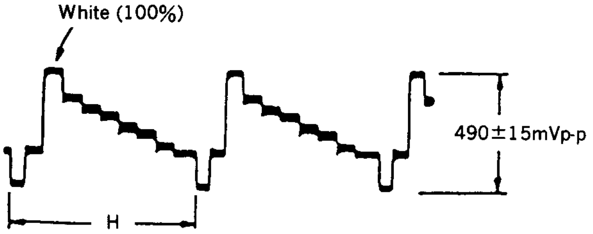


Fig. 10-20.

(2) E Mode Y FM Carrier Frequency Adjustment (VC-106 Board)

Mode	E-E
Signal	No signal
Measurement point	W401 pin ㊱ (Y RF) (JL428)
Measuring instrument	Frequency counter Oscilloscope
Adjustment element	RV406
Specified value	5.98±0.04MHz

Note : This frequency counter should be connected through a buffer amplifier (oscilloscope, etc.) having a high impedance and a low capacitance.

[Adjustment Method]

1) Set an ME type cassette tape.
2) Adjust RV406 to obtain the level 5.98±0.04MHz.

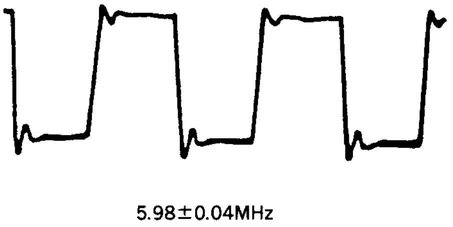


Fig. 10-21.

10-5-11. YD Adjustment (VC-106 Board)

Mode	Playback
Signal	Alignment tape: for operational check dropout portion
Measurement point	VIDEO OUT terminal (terminated at 75Ω)
Measuring instrument	Oscilloscope
Adjustment element	RV403
Specified value	The dropout portion must be flat.

[Adjustment Method]

1) Adjust RV403 so that the dropout portion is flat.

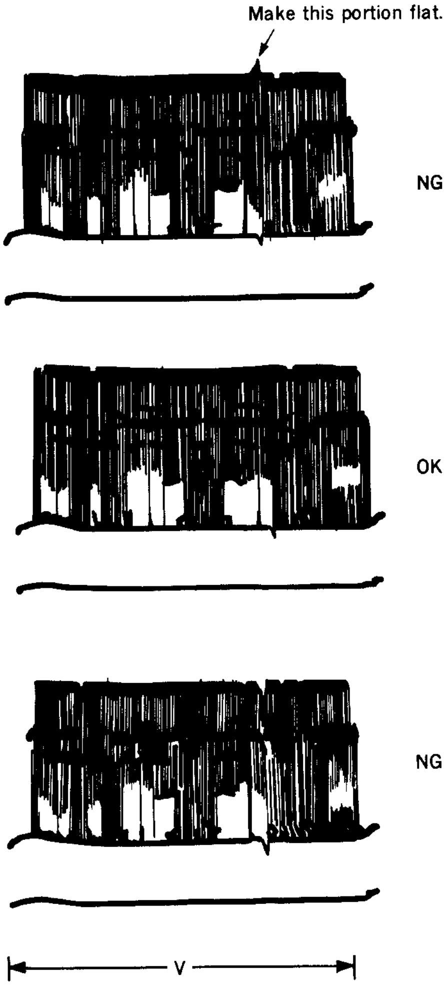

Make this portion flat.
NG
OK
NG
V

Fig. 10-22.

10-5-12. Chroma Emphasis Adjustment (VC-106 Board)

Mode	Playback
Signal	Alignment tape: for operational check color bar portion
Measurement point	VIDEO IN/OUT terminal
Measuring instrument	Vectorscope
Adjustment element	FL502
Specified value	The vector locus from blue to black must return to the origin.

[Adjustment Method]

1) Adjust FL502 so that the vector locus from blue to black returns to the origin.

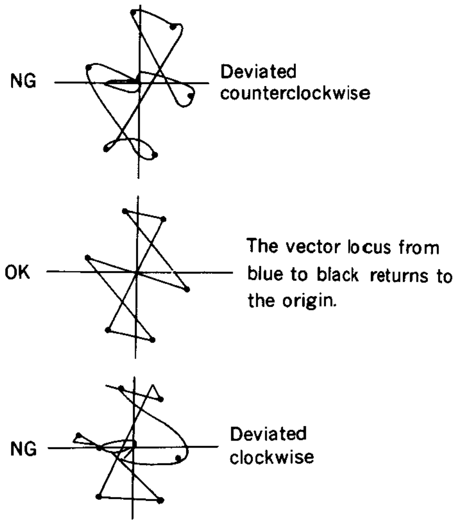

NG
Deviated counterclockwise
OK
The vector locus from blue to black returns to the origin.
NG
Deviated clockwise

Fig. 10-23.

10-5-13. Chroma Comb Filter Adjustment (2) (VC-106 Board)

Mode	Playback
Signal	Alignment tape :for operational check color bar portion
Measurement point	VIDEO IN/OUT terminal
Measuring instrument	Vectorscope
Adjustment element	RV551 RV402
Specified value	The vectorscope shows no change when EDIT switch is toggled between ON and OFF.

[Adjustment Method]

1) Adjust RV551 so that the vectorscope shows no change in the direction of phase.
2) If there is also any change in the direction of amplitude, adjust RV402.
3) Repeat Steps 1) and 2) until the vectorscope shows no change when the EDIT switch is toggled between ON and OFF repeatedly.

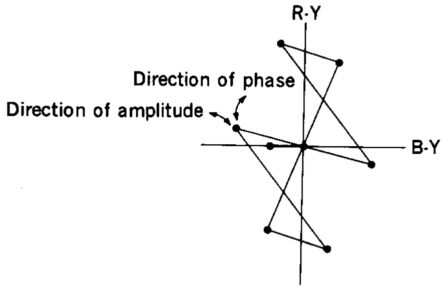


Fig. 10-24.

5-5-14. REC C RF Level Adjustment (VC-106 Board)

Mode	Playback
Signal	Color bar signal
Measurement point	W401 pin ㉟ (REC C RF) (JL427)
Measuring instrument	Oscilloscope
Adjustment element	RV501
Specified value	130±5mVp-p.

[Adjustment Method]

1) Adjust RV501 so that the flat portion of the chroma signal RED component has the level 130±5mVp-p.

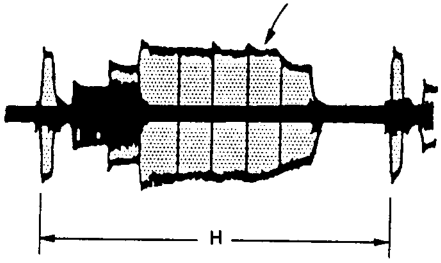

Adjustment so that the flat portion of the chroma signal RED component has the level 130±5mVp-p

Fig. 10-25.

10-5-15. Recording Current Adjustment (VS-106 Board)

Note : An ME tape is used and E mode (LP) is selected for this adjustment. Check to ensure that these conditions are met before entering. Also, this adjustment assumes that "REC C RF Level Adjustment" has been completed.

(1) REC Y Recording Current Preset Adjustment

Mode	Record (LP)
Signal	No signal
Measurement point	CN002 pin ⑧ (REC 1A)
Measuring instrument	Oscilloscope
Adjustment page	D
Adjustment address	2A
Specified value	350±10mVp-p

[Adjustment Method]

1) Set an ME tape and select Record mode (LP).
2) Select adjustment page 0, adjustment address 00 and adjustment data 01 with the adjustment remote control.
3) Select adjustment page D and adjustment address 2A with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control and adjust to 350±10mVp-p.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

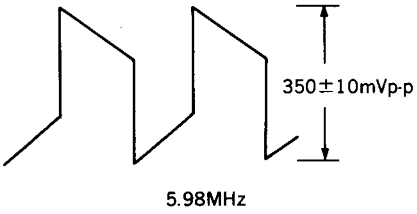


Fig. 10-26.

(2) REC C Recording Current Preset Adjustment

A : In case of REC 1A

Mode	Record (LP)
Signal	Color bar
Measurement point	CH-1 : CN002 pin ⑧ (REC 1A) CH-2 : CN002 pin ⑨ (1/2 RF $\overline{\text{SWP}}$)
Measuring instrument	Oscilloscope
Adjustment page	D
Adjustment address	26 20
Specified value	90±3mVp-p

[Connection]

1) Short the REC Y RF (JL156) and the REC 5V (JL154).
2) Short the REF PILOT (JL788) and the REG GND (JL699).
3) Remove the AU-121 board.

[Adjustment Method]

1) Set an ME tape and select Record mode (LP).
2) Select adjustment page 0, adjustment address 00 and adjustment data 01 with the adjustment remote control.
3) Select adjustment page D and adjustment address 26 with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control and adjust to 90±3mVp-p.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
6) Set to adjustment address 20 and write the same data for adjustment address 26 with the adjustment remote control.
7) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

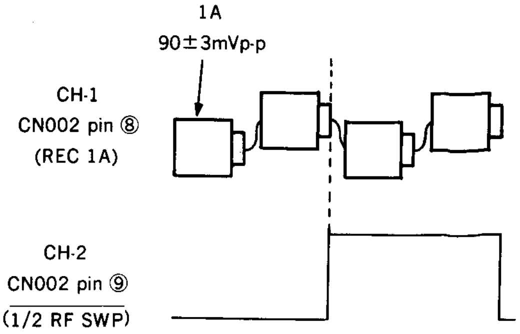


Fig. 10-27.

B : In case of REC 1B

Mode	Record (LP)
Signal	Color bar
Measurement point	CH-1 : CN002 pin ⑦ (REC 1B) CH-2 : CN002 pin ⑨ (1/2 RF SWP)
Measuring instrument	Oscilloscope
Adjustment page	D
Adjustment address	27 21
Specified value	90±3mVp-p

[Connection]

1) Short the REC Y RF (JL156) and the REC 5V (JL154).
2) Short the REF PILOT (JL788) and the REG GND (JL699).
3) Remove the AU-121 board.

[Adjustment Method]

1) Set an ME tape and select Record mode (LP).
2) Select adjustment page 0, adjustment address 00 and adjustment data 01 with the adjustment remote control.
3) Select adjustment page D and adjustment address 27 with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control and adjust to 90±3mVp-p.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
6) Set to adjustment address 21 and write the same data for adjustment address 27 with the adjustment remote control.
7) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

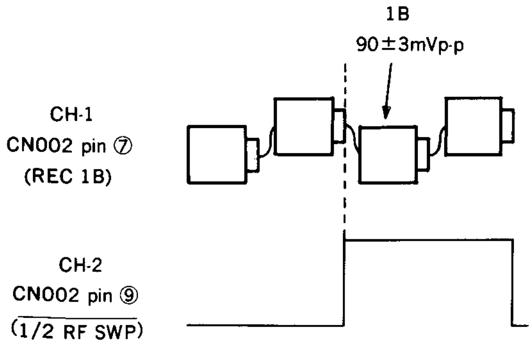


Fig. 10-28.

C : In case of REC 2A

Mode	Record (LP)
Signal	Color bar
Measurement point	CH-1 : CN002 pin ⑥ (REC 2A) CH-2 : CN002 pin ⑨ (1/2 RF SWP)
Measuring instrument	Oscilloscope
Adjustment page	D
Adjustment address	28 22
Specified value	90±3mVp-p

[Connection]

1) Short the REC Y RF (JL156) and the REC 5V (JL154).
2) Short the REF PILOT (JL788) and the REG GND (JL699).
3) Remove the AU-121 board.

[Adjustment Method]

1) Set an ME tape and select Record mode (LP).
2) Select adjustment page 0, adjustment address 00 and adjustment data 01 with the adjustment remote control.
3) Select adjustment page D and adjustment address 28 with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control and adjust to 90±3mVp-p.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
6) Set to adjustment address 22 and write the same data for adjustment address 28 with the adjustment remote control.
7) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

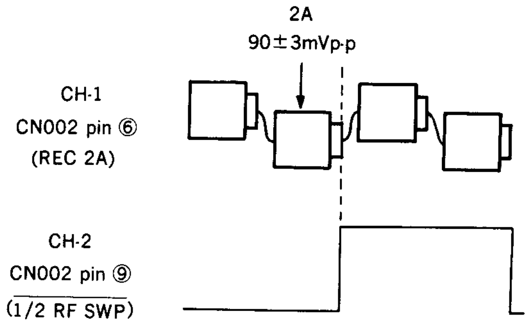


Fig. 10-29.

D : In case of REC 2B

Mode	Record (LP)
Signal	Color bar
Measurement point	CH-1 : CN002 pin ⑤ (REC 2B) CH-2 : CN002 pin ⑨ ($\overline{1/2 \text{ RF SWP}}$)
Measuring instrument	Oscilloscope
Adjustment page	D
Adjustment address	29 23
Specified value	90±3mVp-p

[Connection]

1) Short the REC Y RF (JL156) and the REC 5V (JL154).
2) Short the REF PILOT (JL788) and the REG GND (JL699).
3) Remove the AU-121 board.

[Adjustment Method]

1) Set an ME tape and select Record mode (LP).
2) Select adjustment page 0, adjustment address 00 and adjustment data 01 with the adjustment remote control.
3) Select adjustment page D and adjustment address 29 with the adjustment remote control.
4) Change the adjustment data with the adjustment remote control and adjust to 90±3mVp-p.
5) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.
6) Set to adjustment address 23 and write the same data for adjustment address 29 with the adjustment remote control.
7) Press the PAUSE button on the adjustment remote control in order to store the adjustment data.

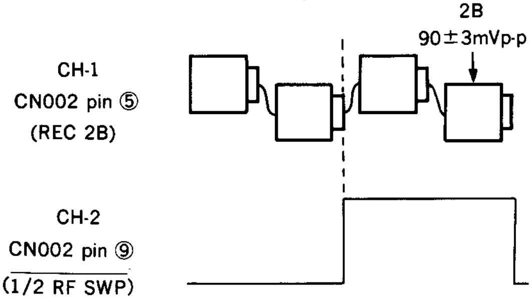


Fig. 10-30.

(3) REC AFM Recording Current Preset Check

Mode	Record (LP)
Signal	No signal
Measurement point	Q197 emitter (REC C RF)
Measuring instrument	Oscilloscope
Specified value	80±20mVp-p

[Connection]

1) Short the REF PILOT (JL788) and the REG GND (JL699).

[Checking Method]

1) Set an ME tape and select Record mode (LP).
2) Check for 80±20mVp-p.

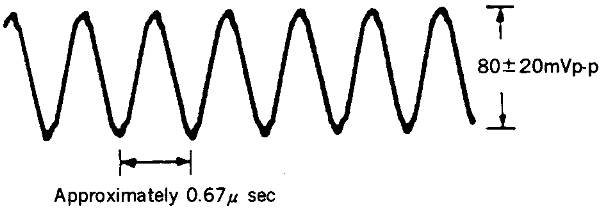


Fig. 10-31.

(4) REC ATF Recording Current Preset Check

Mode	Record (LP)
Signal	No signal
Measurement point	Q197 emitter (REC C RF)
Measuring instrument	Oscilloscope
Specified value	40±10mVp-p

[Connection]

1) Remove the AU-121 board.

[Checking Method]

1) Set an ME tape and select Record mode (LP).
2) Check for 40±10mVp-p.

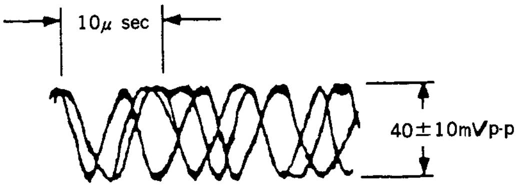


Fig. 10-32.

(5) Chroma Flicker Check and Adjustment (VS-87 Board)

Mode	Self record playback
Signal	Color bar
Measurement point	CH-1 (1 : 1 probe): Q506 collector (PB C RF IN) CH-2 (10 : 1 probe): CN002 pin ⑨ ($\overline{\text{1/2 RF SWP}}$)
Measuring instrument	Oscilloscope
Adjustment page	D
Adjustment address	26 (ME REC C 1A) 27 (ME REC C 1B) 28 (ME REC C 2A) 29 (ME REC C 2B)
Specified value	$\frac{Vc1a}{Vc1a'}\times100=100^{+12}_{-11}$ (%) $\frac{Vc2a}{Vc2a'}\times100=100^{+12}_{-11}$ (%)

Note: This adjustment assumes that both "REC Y Recording Current Preset Adjustment" and "REC C Recording Current Preset Adjustment" have been completed.

[Checking Method]

1) Record the color bar signal.
2) Play back the recorded portion.
3) Select adjustment page 0, adjustment address 01 and adjustment data 00 with the adjustment remote control.
4) Let 1a and 2a output levels measured to be Vc1a and Vc2a respectively.
5) Select adjustment page 0, adjustment address 01 and adjustment data 04 with the adjustment remote control.
6) Let 1a and 2a output levels measured to be Vc1a' and Vc2a' respectively.
7) If any of the specified values is not met, perform the following adjustment.

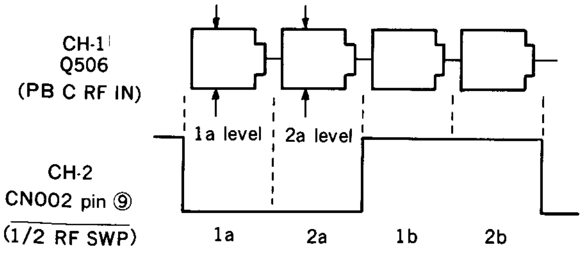


Fig. 10-33.

[Adjustment Method]

1) If any of the specified values is not met, from the measured values, calculate the following values:

$\Delta Vc1=|Vc1a-Vc1a'|/2$

$\Delta Vc2=|Vc2a-Vc2a'|/2$

Note: | | represents an absolute value.

2) Make the following calculations:

The smaller level of playback levels Vc1a and Vc1a' is:

$$A=\left\{\frac{(\text{Smaller value of Vc1a and Vc1a'})+\Delta Vc1}{(\text{Smaller value of Vc1a and Vc1a'})}\right\}\times52(\text{mVp-p})$$

The larger level of playback levels Vc1a and Vc1a' is:

$$B=\left\{\frac{(\text{Larger value of Vc1a and Vc1a'})-\Delta Vc1}{(\text{Larger value of Vc1a and Vc1a'})}\right\}\times52(\text{mVp-p})$$

The smaller level of playback levels Vc2a and Vc2a' is:

$$C=\left\{\frac{(\text{Smaller value of Vc2a and Vc2a'})+\Delta Vc2}{(\text{Smaller value of Vc2a and Vc2a'})}\right\}\times52(\text{mVp-p})$$

The larger level of playback levels Vc2a and Vc2a' is:

$$D=\left\{\frac{(\text{Larger value of Vc2a and Vc2a'})-\Delta Vc2}{(\text{Larger value of Vc2a and Vc2a'})}\right\}\times52(\text{mVp-p})$$

3) Let the values calculated from Vc1a, Vc1a', Vc2a and Vc2a' to be the specified values for 1a, 1b, 2a, and 2b respectively. Based on these specifications, perform "REC C Recording Current Preset Adjustment".
When adjusting to the specified value, compare Vc1a with Vc1a'. If Vc1a is larger than Vc1a', set 1a to A and 1b to B. If Vc1a is smaller than V1a', set 1a to B and 1b to A.
In the same manner, compare Vc2a with Vc2a'. If Vc2a is larger than Vc2a', set 2a to C and 2b to D. If Vc2a is smaller than Vc2a', set 2a to D and 2b to C.
4) After this adjustment, perform "Chroma Flicker Check" again and repeat this adjustment until the specifications are met.

10-5-16. Y Level Adjustment (VS-87 Board)

Mode	E-E
Signal	Color bar (S VIDEO)
Measurement point	CN304 pin ⑰ (V OUT Y) (JL301)
Measuring instrument	Oscilloscope
Adjustment element	RV301
Specified value	450±10mVp-p

Note : This adjustment assumes that "SYNC AGC Adjustment" has been completed.

[Adjustment Method]

1) Adjust RV301 to obtain the level 450±10mVp-p.

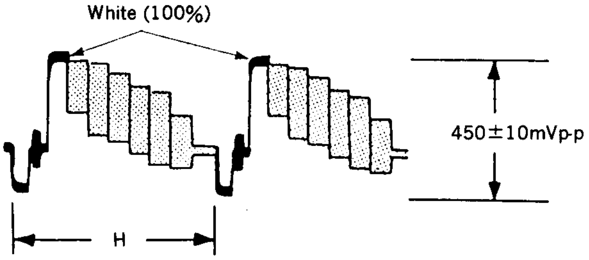


Fig. 10-34.

10-5-17. HUE Phase Deviation Adjustment (VC-106 Board) (Use a Vectorscope)

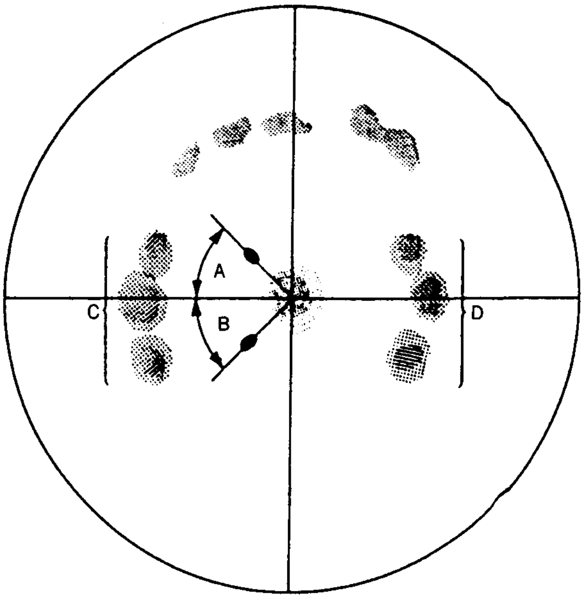
Mode	Playback+Pause
Signal	Alignment tape for operation check (WR5-5CSP), Color bar portion
Measurement point	VIDEO IN/OUT terminal
Measuring instrument	Vectorscope
Adjustment element	RV351 (FSC) RV352 (APC LPF)
Specified value	See Fig. 10-35.

[Connection]

1) Input 4.43MHz signal from Pin⑫ of IC501 to 1CH of an oscilloscope.
2) Connect 1CH output of an oscilloscope to the EXT. subcarrier reference input of a vectorscope.
3) Put on the EXT. subcarrier switch of a vectorscope.

[Adjustment Method]

1) Adjust with RV351 so as to equalize A and B as shown in Fig. 10-35.
2) Adjust with RV352 so as to minimize the shaking of each three brighting point of C and D.



RV351 : A=B
RV352 : maka C and D a contrast

Fig. 10-35.

10-5-18. Titler PLL Adjustment (TI-40 Board)

Mode	E-E
Signal	No signal
Measurement point	See Fig. 10-36. (V_{PLL} : JL832)
Measuring instrument	Oscilloscope (DC range)
Adjustment element	CT801
Specified value	2.42±0.1Vdc

[Connection]

1) Short pin ⑫ of CN801 (SS 5V : JL821) and pin (64) of IC803 (PLL ADJ : JL831) with a jumper wire.

[Adjustment Method]

1) Adjust to 2.42±0.1Vdc with CT801.
2) After this adjustment, remove the jumper wire.

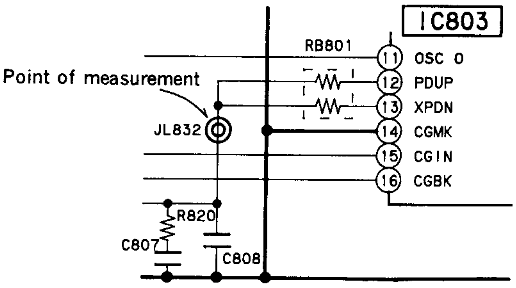

IC803
RB801
Point of measurement
JL832
⑪ OSC O
⑫ PDUP
⑬ XPDN
⑭ CGMK
⑮ CGIN
⑯ CGBK
R820
C807
C808

Fig. 10-36.

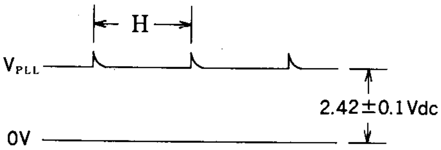

H
V_{PLL}
2.42±0.1Vdc
0V

Fig. 10-37.

10-5-19. Character Generator Clock Adjustment (TI-40 Board)

Mode	E-E
Signal	No signal
Measurement point	IC802 pin ⑦ (JL830)
Measuring instrument	Frequency counter Oscilloscope
Adjustment element	CT802
Specified value	6.94±0.05MHz

Note : This frequency counter should be connected through a buffer amplifier (oscilloscope, etc.) having a high impedance and a low capacitance.

[Adjustment Method]

1) Adjust to 6.94±0.05MHz with CT802.
2) After this adjustment, remove the jumper wire.

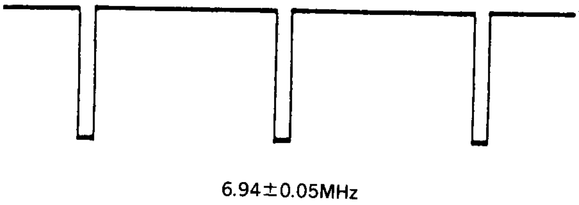


Fig. 10-38.

10-6. AUDIO SYSTEM ADJUSTMENT

- The color bar signal should be used as the video signal input for these adjustments.

[Connection of Audio Measuring Instruments]

When performing the Audio System Adjustment, connect audio system measuring instruments as well as video system measuring instruments as illustrated in Fig. 10-39. And place the POWER switch in the "VIDEO" position. Change the IN/OUT select switch depending on the current mode as follows:

- IN position ················Record mode
- OUT position ············Playback mode

Unless otherwise specified, place the BILINGUAL switch in the following position:

- Green (STEREO) position

Note 1 : When inputting audio signal, input the same signal on both the L and R channels unless otherwise specified.

Note 2 : Be sure to insert a plug (shorting plug or dummy plug) into the AUDIO IN/OUT terminal (right). If no plug is inserted to the terminal, the MONAURAL mode is activated which does not permit correct adjustment.

(MONAURAL mode)

Record ················The REC AFM RF 1.7MHz carrier will not be output.

Playback ············L+R signal will be output from the audio INPUT/OUTPUT terminal (left).

Note 3 : For the adjustment items in which the adjustment is made on both L and R channels, [ ] indicates the adjustment item on the R channel.

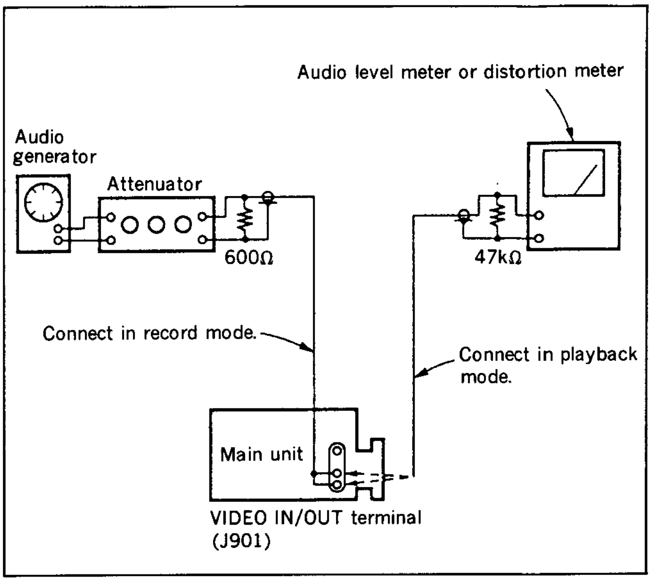

Audio level meter or distortion meter
Audio generator
Attenuator
600Ω
47kΩ
Connect in record mode.
Connect in playback mode.
Main unit
VIDEO IN/OUT terminal (J901)

Fig. 10-39.

[Adjustment Sequence]

10-6-1. Recording Matrix L—R Adjustment
10-6-2. Recording Matrix L+R Check
10-6-3. IR Adjustment
10-6-4. 1.5MHz Carrier Frequency Check
10-6-5. 1.7MHz Carrier Frequency Check
10-6-6. Deviation Adjustment
10-6-7. Playback Matrix L—R Adjustment
10-6-8. 1.5MHz Recording Level Check
10-6-9. 1.7MHz Recording Level Check
10-6-10. Overall Level Characteristic Check
10-6-11. Overall Frequency Characteristic Check
10-6-12. Overall Level Characteristic Separation Check
10-6-13. Overall Distortion Check
10-6-14. Overall Noise Level Check

10-6-1. Recording Matrix L-R Adjustment (AU-121 Board)

Mode	Record
Signal	400Hz, −7.5dBs: Input to AUDIO IN/OUT jacks, L and R channels
Measurement point	IC802 pin ㉛ (JL863)
Measuring instrument	Oscilloscope
Adjustment element	RV806
Specified value	0±5mVp-p

Note : A 1 : 1 probe should be used.

[Adjustment Method]

1) Adjust RV806 so that the signal level is 0±5mVp-p.

10-6-2. Recording Matrix L+R Check (AU-121 Board)

Mode	Record
Signal	1. 400Hz, −7.5dBs: AUDIO IN/OUT jack, L channel 2. 400Hz, −7.5dBs: AUDIO IN/OUT jack, R channel
Measurement point	IC801 pin ㉛ (JL843)
Measuring instrument	Oscilloscope
Specified value	The difference in the level measured for between input to L-channel jack and input to R-channel jack must be within 0±10mVp-p.

Note : When measuring the signal level at pin ㉛ of IC801, allow more than 1 minute after the signal is input before measurement. (This is intended to stabilize the AGC.)

[Checking Method]

1) Input the signal 400Hz, −7.5dBs only to the L-channel AUDIO IN/OUT jack. (Insert a shorting plug into the R-channel AUDIO IN/OUT jack.)
2) Read the signal level at pin ㉛ of IC801 and make a note of it.
3) Input the signal 400Hz, −7.5dBs only to the R-channel AUDIO IN/OUT jack. (Insert a shorting plug into the L-channel AUDIO IN/OUT jack.)
4) Check to ensure that the level at pin ㉛ of IC801 is [the level measured in Step 2)]±10mVp-p.

10-6-3. IR Adjustment (AU-121 Board)

Mode	Self record playback
Measurement point	1.5M IR : IC801 pin ㊹ (JL852)-pin ⑥ (JL853) 1.7M IR : IC802 pin ㊹ (JL874)-pin ⑥ (JL875)
Measuring instrument	Digital voltmeter
Adjustment element	1.5M IR : RV801 1.7M IR : RV803
Specified value	0±10mVdc

[Adjustment Method]

1) Record the signal.
2) Play back the signal recorded in Step 1).
3) Adjust RV801 and RV803 so that the potential differences between the two points for 1.5M IR and 1.7M IR are 0±10mVdc respectively.

10-6-4. 1.5MHz Carrier Frequency Check (AU-121 Board)

Mode	Record
Signal	No signal
Measurement point	IC801 pin ⑧ (JL848)
Measuring instrument	Frequency counter Oscilloscope
Specified value	1.500±0.002MHz

Note 1 : A 10 : 1 probe should be used for connection of a frequency counter.

Note 2 : This frequency counter should be connected through a buffer amplifier (oscilloscope, etc.) having a high impedance and a low capacitance.

[Checking Method]

1) Check the 1.5MHz carrier frequency for 1.500±0.002MHz.

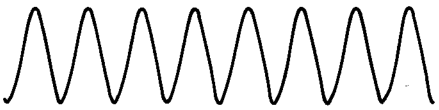


Fig. 10-40.

10-6-5. 1.7MHz Carrier Frequency Check (AU-121 Board)

Mode	Record
Signal	No signal
Measurement point	IC802 pin ⑧ (JL868)
Measuring instrument	Frequency counter Oscilloscope
Specified value	1.700±0.002MHz

Note 1 : A 10 : 1 probe should be used for connection of a frequency counter.

Note 2 : This frequency counter should be connected through a buffer amplifier (oscilloscope, etc.) having a high impedance and a low capacitance.

[Checking Method]

1) Check the 1.7MHz carrier frequency for 1.700±0.002MHz.

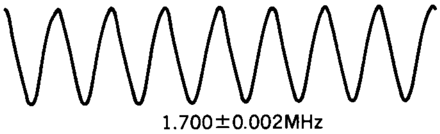


Fig. 10-41.

10-6-6. Deviation Adjustment (AU-121 Board)

(1) 1.5MHz Deviation Adjustment

Mode	Playback
Signal	Alignment tape : for operational check (WR5-9CS)
Measurement point	AUDIO IN/OUT jack, L channel
Measuring instrument	Audio level meter
Adjustment element	RV802
Specified value	−7.5±0.2dB

Note : Set the BILINGUAL switch to MAIN.

[Adjustment Method]

1) Adjust RV802 to obtain the level −7.5±0.2dB.

(2) 1.7MHz Deviation Adjustment

Mode	Playback
Signal	Alignment tape : for operational check (WR5-9CS)
Measurement point	AUDIO IN/OUT jack, R channel
Measuring instrument	Audio level meter
Adjustment element	RV804
Specified value	−7.5±0.2dB

Note : Set the BILINGUAL switch to SUB.

[Adjustment Method]

1) Adjust RV804 to obtain the level −7.5±0.2dB.

10-6-7. Playback Matrix L-R Adjustment (AU-121 Board)

Mode	Self record playback
Signal	Alignment tape : for operational check (WR5-9CS)
Measurement point	AUDIO IN/OUT jack, L channel
Measuring instrument	Audio level meter
Adjustment element	RV805
Specified value	−40dBs or less

[Adjustment Method]

1) Record the signal. (A shorting plug should be inserted into the L-channel AUDIO IN/OUT jack.)
2) Play back the recorded portion.
3) Adjust RV805 so that the level at the L-channel AUDIO IN/OUT jack is −40dBs or less.

10-6-8. 1.5MHz Recording Level Check (AU-121 Board)

Mode	Record
Signal	No signal
Measurement point	CN801 pin ⑦ (REC AFM) (JL806)
Measuring instrument	Oscilloscope
Specified value	48±8mVp-p

[Connection]

1) Remove the pin plug from the R-channel AUDIO IN/OUT jack (red). (MONORAL Record mode)

[Checking Method]

1) Check the 1.5MHz REC AFM RF signal level for 48±8mVp-p. (Read the center level of the bright line width.)

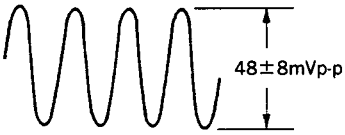


Fig. 10-42.

10-6-9. 1.7MHz Recording Level Check (AU-121 Board)

Mode	Record
Signal	No signal
Measurement point	CN801 pin ⑦ (REC AFM) (JL806)
Measuring instrument	Oscilloscope
Specified value	42±6mVp-p

Note: When measuring this level, short pin ⑧ of IC801 (JL848) with GND.

[Checking Method]

1) Check to ensure that a shorting plug is inserted into the R-channel AUDIO IN/OUT jack (red).
2) Check the 1.7MHz REC AFM RF signal level for 42±6mVp-p. (Read the center level of the bright line width.)

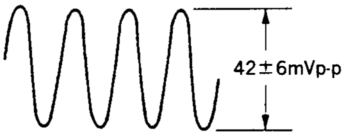


Fig. 10-43.

10-6-10. Overall Level Characteristic Check

Mode	Self record playback
Signal	400Hz, −7.5dBs
Measurement point	AUDIO OUT jack, L channel [R channel]
Measuring instrument	Audio level meter
Specified value	−7.5±2dBs

[Checking Method]

1) Record the signal.
2) Play back the recorded portion.
3) Check the audio output level for −7.5±2dBs.

10-6-11. Overall Frequency Characteristic Check

Mode	Self record playback
Signal	Ⓐ 400Hz, −17.5dBs Ⓑ 30Hz, −17.5dBs Ⓒ 10kHz, −17.5dBs
Measurement point	AUDIO OUT jack, L channel [R channel]
Measuring instrument	Audio level meter
Specified value	When 400Hz playback output level is set to 0dB, the respective playback levels for 30Hz and 10kHz must be 0±3dB.

[Checking Method]

1) Record the signals Ⓐ to Ⓒ in sequence.
2) Play back the recorded portion.
3) When the 400Hz playback output level is set to 0dB, check to ensure that the respective playback levels for 30Hz and 10kHz are 0±3dB.

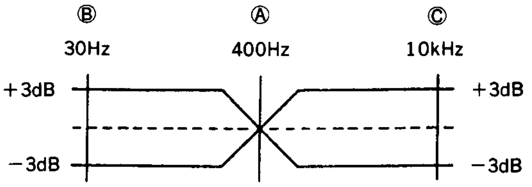


Fig. 10-44.

10-6-12. Overall Level Characteristic Separation Check

Mode	Self record playback
Signal	400Hz, −17.5dBs: AUDIO IN/OUT jack, L channel [R channel] No signal (Insert a shorting plug.): AUDIO IN/OUT jack, R channel [L channel]
Measurement point	AUDIO OUT jack, L channel [R channel]
Measurement instrument	Audio level meter
Specified value	Signal level: −7.5±2dBs Crosstalk level: −27.5dBs or less

Note 1: When measuring the L-channel playback output level, be sure to insert a dummy plug into the R-channel jack.

Note 2: Make sure that the BILINGUAL switch is placed in the Green (STEREO) position.

[Checking Method]

1) Record the signal.
2) Play back the recorded portion.
3) Check the output level at the L-channel [R-channel] AUDIO IN/OUT jack for −7.5±2dBs.
4) Check the output level at the R-channel [L-channel] AUDIO IN/OUT jack for −27.5dBs or less.

10-6-13. Overall Distortion Check

Mode	Self record playback
Signal	400Hz, −7.5dBs
Measurement point	AUDIO OUT jack, L channel [R channel]
Measuring instrument	Distortion meter
Specified value	0.8% or less*1

[Checking Method]

1) Record the signal.
2) Play back the recorded portion.
3) Check that the distortion factor is 0.8% or less*1.
   * 1: The value when 200Hz to 6kHz BPF is used.

10-6-14. Overall Noise Level Check

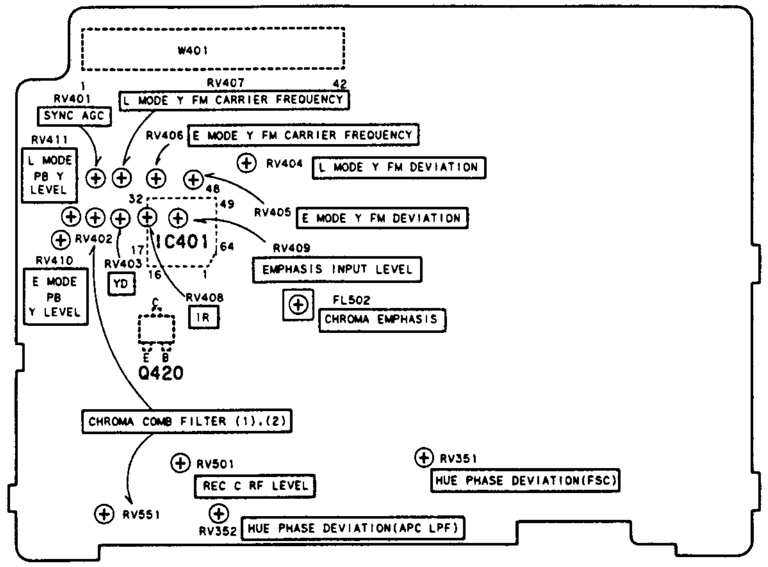
Mode	Self record playback
Signal	No signal (Insert a shorting plug into the AUDIO IN jack.)
Measurement point	Audio OUT jack, L channel [R channel]
Measuring instrument	Audio level meter
Specified value	−65.0dBs or less*2

[Checking Method]

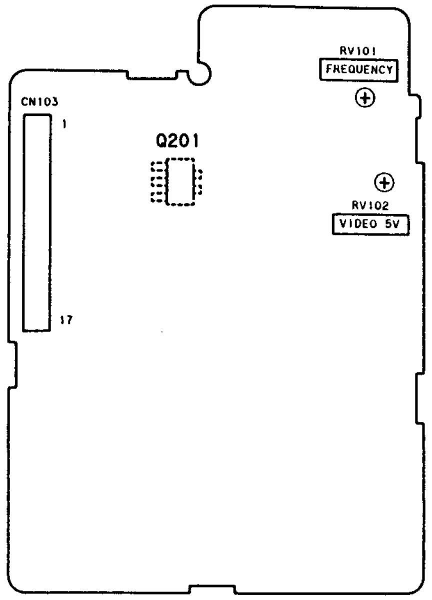
1) Record the signal.
2) Play back the recorded portion.
3) Check that the noise level is −65.0dBs or less*2.
   * 2: The value when a IHF-A weighing filter is used.

10-7. ADJUSTING PART LOCATION DIAGRAM

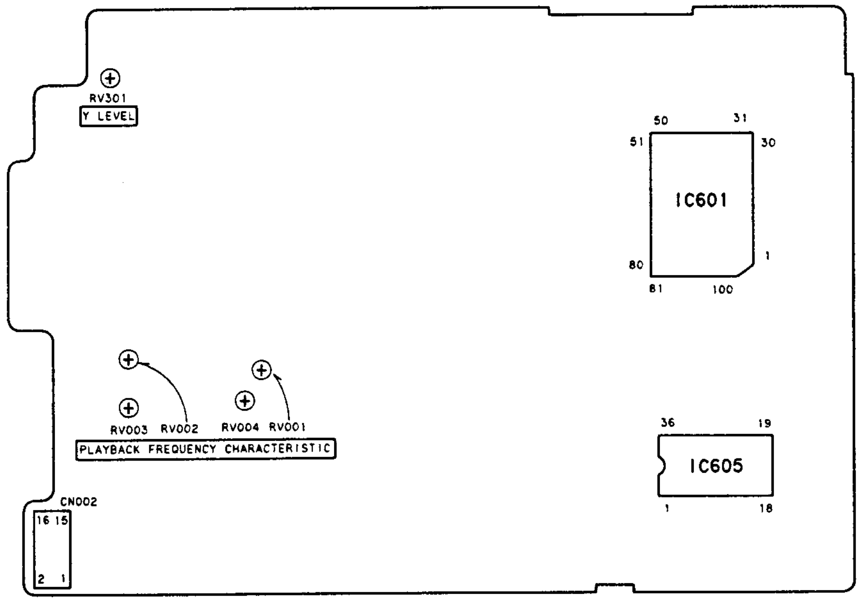
VC-106 BOARD (COMPONENT SIDE)


W401
1
RV407
42
RV401
SYNC AGC
L MODE Y FM CARRIER FREQUENCY
RV406
E MODE Y FM CARRIER FREQUENCY
RV411
L MODE PB Y LEVEL
RV404
L MODE Y FM DEVIATION
48
32
49
RV405
E MODE Y FM DEVIATION
RV402
17
IC401
64
RV409
RV410
RV403
16
1
EMPHASIS INPUT LEVEL
E MODE PB Y LEVEL
YD
RV408
IR
FL502
CHROMA EMPHASIS
C
E B
Q420
CHROMA COMB FILTER (1).(2)
RV501
REC C RF LEVEL
RV351
HUE PHASE DEVIATION(FSC)
RV551
RV352
HUE PHASE DEVIATION(APC LPF)

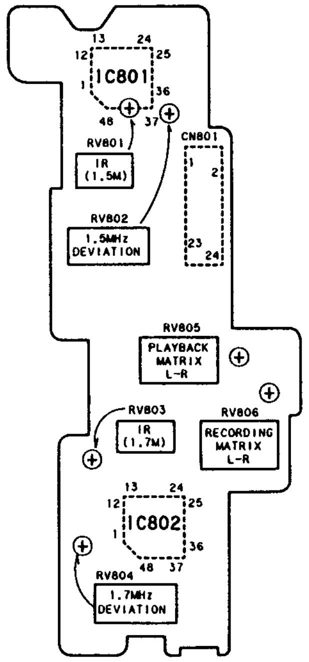
DD-33P BOARD (COMPONENT SIDE)


RV101
FREQUENCY
CN103
1
Q201
RV102
VIDEO 5V
17

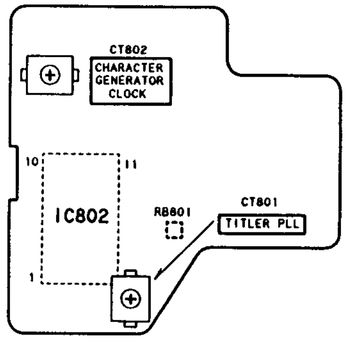
VS-87 BOARD (COMPONENT SIDE)


RV301
Y LEVEL
50
31
51
30
IC601
80
1
81
100
RV003
RV002
RV004
RV001
PLAYBACK FREQUENCY CHARACTERISTIC
36
19
IC605
1
18
CN002
16 15
2 1

AU-121 BOARD
(COMPONENT SIDE)


13
24
12
25
IC801
1
36
48
37
RV801
IR (1.5M)
CN801
1
2
RV802
1.5MHz DEVIATION
23
24
RV805
PLAYBACK MATRIX L-R
RV803
IR (1.7M)
RV806
RECORDING MATRIX L-R
13
24
12
25
IC802
1
36
48
37
RV804
1.7MHz DEVIATION

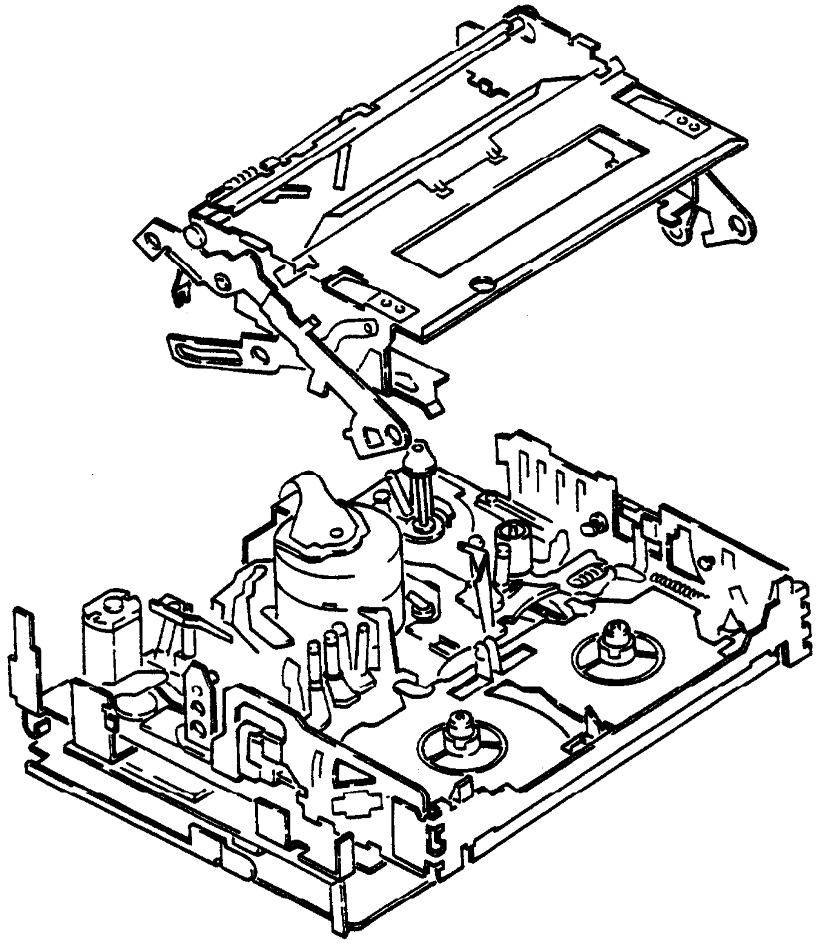
TI-40 BOARD
(COMPONENT SIDE)


CT802
CHARACTER GENERATOR CLOCK
10
11
IC802
RB801
CT801
TITLER PLL
1

8mm Video MECHANICAL ADJUSTMENT MANUAL II

FL MECHANISM (Q MECHANISM) Video 8

File with the SERVICE MANUAL



8 VIDEO RECORDER

SONY®

TABLE OF CONTENTS

1. PREPARATION FOR MECHANICAL CHECK, ADJUSTMENT AND REPLACEMENT 3
- 1-1. Cassette Compartment Holder Assembly 3
- 1-2. Cassette Compartment Look Height Adjustment .. 4
- 1-3. Operation with Cassette Compartment Holder Assembly Removed 5
- 1-4. Handing of Mode Selector 6
- 1-5. Mode Selector Schematic Diagram 7
- 1-6. Mode Selector Parts List 7

2. PERIODIC CHECK AND MAINTENANCE

- 2-1. Cleaning of Rotary Drum 8
- 2-2. Cleaning of Tape Path 8
- 2-3. Periodic Check Items 9
- 2-4. Service Jigs List 10

3. MECHANICAL CHECK,ADJUSTMENT AND REPLACEMENT

- 3-1. LED Base 11
- 3-2. RL Base Assembly, Retainer 12
- 3-3. S Reel Table Assembly 13
- 3-4. T Reel Table Assembly 14
- 3-5. Oneway Clutch Assembly 15
- 3-6. S Soft Arm Assembly 16
- 3-7. LS Chassis Assembly 17
- 3-8. Pinch Arm Assembly 19
- 3-9. TG-11 Arm Assembly 20
- 3-10. TG-1 Arm Assembly 21
- 3-11. String Joint 22
- 3-12. Guide Arm T Assembly, Guide Arm S Assembly .. 23
- 3-13. Pinch Press Arm Assembly 25
- 3-14. GL Slider Assembly 26
- 3-15. Phase Adjustment 27
- 3-16. Gear Train Operation Check 29
- 3-17. Loading Motor Assembly 30
- 3-18. Guide Rail Base-1 Assembly 31
- 3-19. Guid Rail Base-2 Assembly 32
- 3-20. Guide Rail Base-3 Assembly 33
- 3-21. Capstan Motor Assembly 34
- 3-22. Drum Base Assembly 35
- 3-23. Drum Assembly 36
- 3-24. Replacement of Rotary Upper Drum 37
- 3-25. Reel Table Height Check 39
- 3-26. FWD/RVS Torque Check 39
- 3-27. Tension Regulator Position Adjustment 40
- 3-28. FWD Back Tension Adjustment 41

4. TAPE PATH ADJUSTMENT

- 4-1. Preparation for Adjustment 42
- 4-2. Tracking Adjustment 43
- 4-3. No.4 Guide (TG-4) Adjustment 43
- 4-4. No.11 Guide (TG-11) Adjustment 44
- 4-5. Check after Adjustment 45

1. PREPARATION FOR MECHANICAL CHECK, ADJUSTMENT AND MAINTENANCE

For removal of the cabinet and boards, refer to "Disassembly" in each Service Manual.

Mechanical adjustment is done in the USE mode. (To select the USE mode, refer to "1-4 Handling of Mode Selector".)

1-1 CASSETTE COMPARTMENT HOLDER ASSEMBLY (Fig. 1)

1. Removal

1) Select the USE mode.
2) Remove the screw ●, and then, the LS support ●.
3) Remove the four screws ●, and then, the LS frame assy ●.
4) Remove the three lock washers ●, and then, the washer ●, bar, joint ●, T protector assy ●, and TP arm assy ● in that order.
5) Remove the two screws ●, and then, the two arm shafts A ●.
6) Remove the shaft through the long hole ●. With the cassette compartment holder assembly ● rotated in a direction of the arrow Ⓐ, remove the long holes ● and ● from the shaft in that order, and then, remove the cassette compartment holder assembly ●.
7) Slide the BS holder ● in a direction of the arrow Ⓑ as shown in Fig. A and remove it in a direction of the arrow Ⓒ.

Note : When this is done, be careful not to drop the steel ball and spring, compression out of the BS holder ●.

2. Mounting

1) Select the USE mode.
2) Mount the BS holder ● in the reverse order of its removal. Note: Refer to Fig. A.
3) Mount the shafts in the order of the long holes ●, ● and ● of the cassette compartment holder assembly ●, respectively.

Note : When this is done. rotate the cassette compartment holder assembly ● in a direction of the arrow Ⓐ to mount it until the long hole is aligned with the oval shape of the shaft.

4) Align the oval shape of the two arm shafts A ● with the long holes of the LS chassis, fit them in firmly and fix with the two screws ●.
5) Mount the TP arm assy ●, T protector assy ● and bar, joint ●, respectively. Then, mount the washer ● and three lock washers ●.
6) Mount the LS frame assy ● to the chassis and fix with the four screws ●.
7) Mount the LS support ● to the chassis and fix with the screw ●.

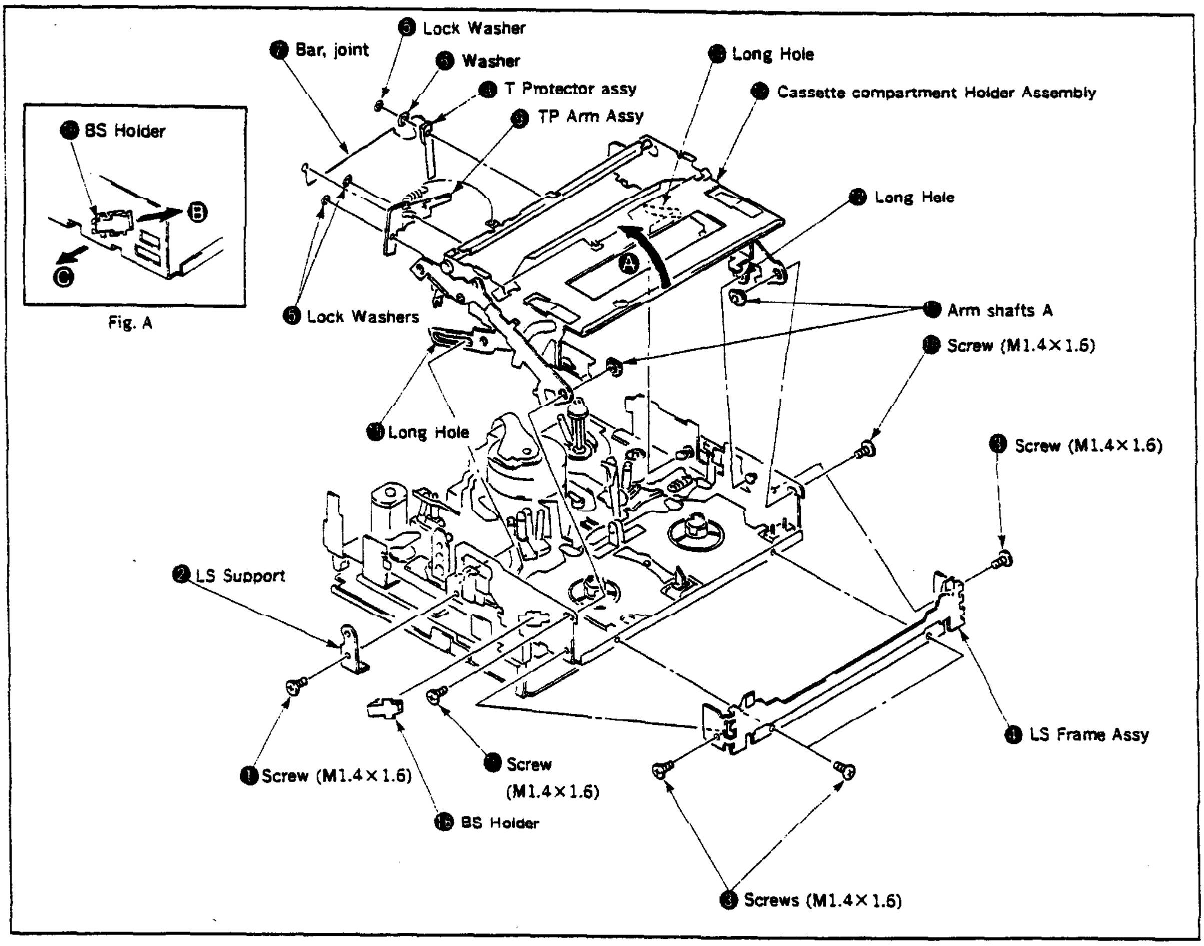

● BS Holder
Ⓑ
Ⓒ
Fig. A
● Lock Washer
● Bar, joint
● Washer
● T Protector assy
● TP Arm Assy
● Long Hole
● Cassette compartment Holder Assembly
● Long Hole
Ⓐ
● Lock Washers
● Arm shafts A
● Screw (M1.4×1.6)
● Long Hole
● Screw (M1.4×1.6)
● LS Support
● LS Frame Assy
● Screw (M1.4×1.6)
● Screw (M1.4×1.6)
● BS Holder
● Screws (M1.4×1.6)

Fig. 1

1-2 CASSETTE COMPARTMENT LOCK HEIGHT ADJUSTMENT (Fig. 2)

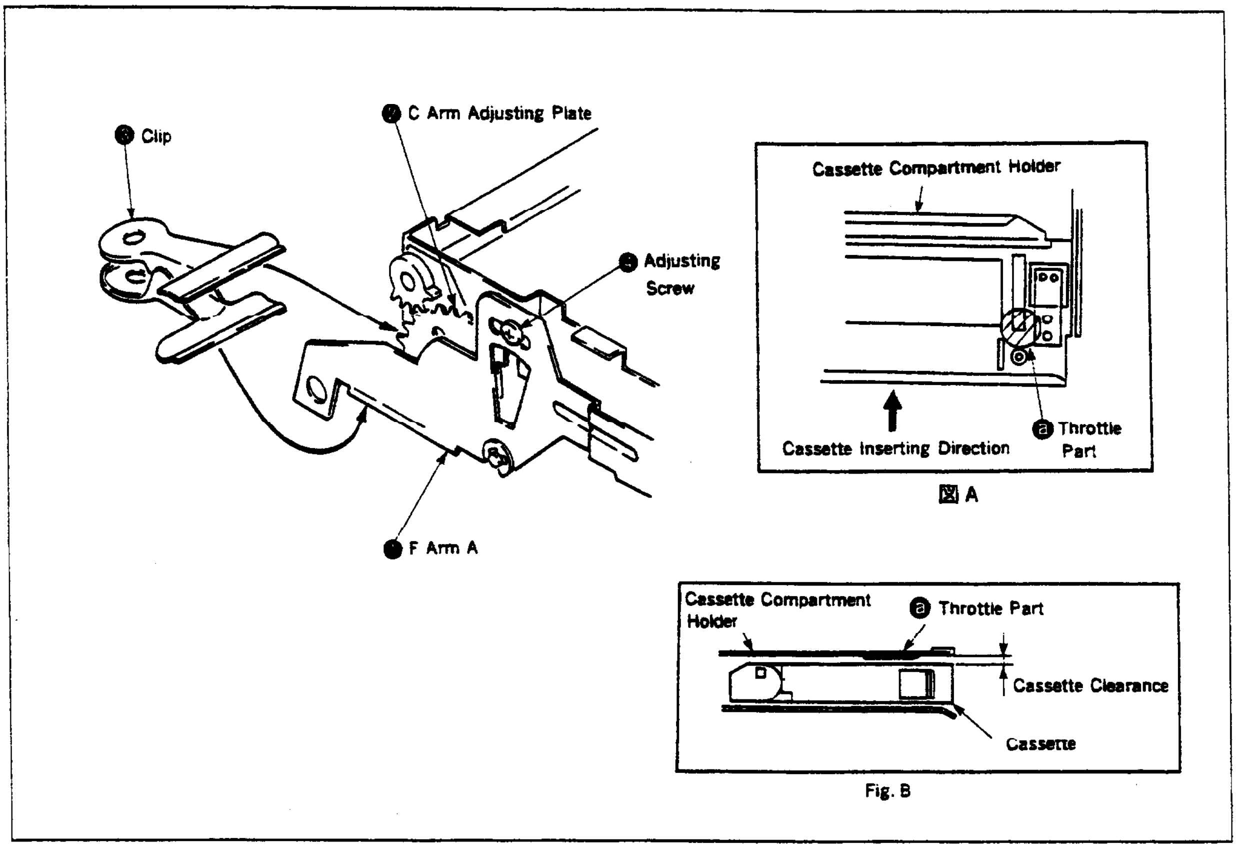
1) Using a spacer, etc., insert a 15.3mm-thick cassette to lock the cassette compartment.

Note : As shown in Fig. A, a 15.3mm-thick portion may be under the throttle partⓐ.

2) Pressing the partⓐ, nip the F arm A ● and the first tooth of the C arm adjusting plate ● with the clip ●, and tighten the adjusting screw ● at a torque of 1kg•cm.

3) Apply Screw Lock to the adjusting screw ● after making sure of the following clearances between the throttle partⓐ of the cassette compartment holder and the cassette as shown in Fig. B.

- For 15mm-thick dummy cassette : 0.5 – 0.9
- For 15.2mm-thick dummy cassette : 0.3 – 0.7


● Clip
● C Arm Adjusting Plate
● Adjusting Screw
● F Arm A
Cassette Compartment Holder
Cassette Inserting Direction
ⓐ Throttle Part
Cassette Compartment Holder
ⓐ Throttle Part
Cassette Clearance
Cassette

図A

Fig. B

Fig. 2

1-3 OPERATION WITH CASSETTE COMPARTMENT HOLDER ASSEMBLY REMOVED

1. Putting into Loading state (Fig. 3)

1) Referring to the Service Manual, supply power with the cabinet and camera section removed. (Make the mechanism deck ready to operate.)
2) Place the cap ● on the LED assembly ●.
3) Press the pin of the push switch ● (ON state) and fix it with adhesive tape ● in that state.
4) Press the locking plate release arm ● in an arrow direction. The set is made ready for loading.

2. Putting into the REC Mode

1) Short the TEST pins (SS-82 board CN404 pins ● and ● for CCD-V11/V88) to place into the TEST mode.

For CCD-V11/V88 ; SS-82 board CN404
TEST pin connector

4	GND
3	$\overline{\text{CAM ADJ}}$
2	$\overline{\text{TEST}}$
1	$\overline{\text{PATH}}$

The set is placed into the TEST mode by shorting the pins ● and ●.

2) After completing the step 1), set the power switch to VTR (or CAMERA).
3) Turn on the REC switch. (If the set is placed in the TEST mode, detection of S and T reel table rotation is disabled and the tape can run.)

3. Putting into EJECT

1) Turn on the EJECT switch.

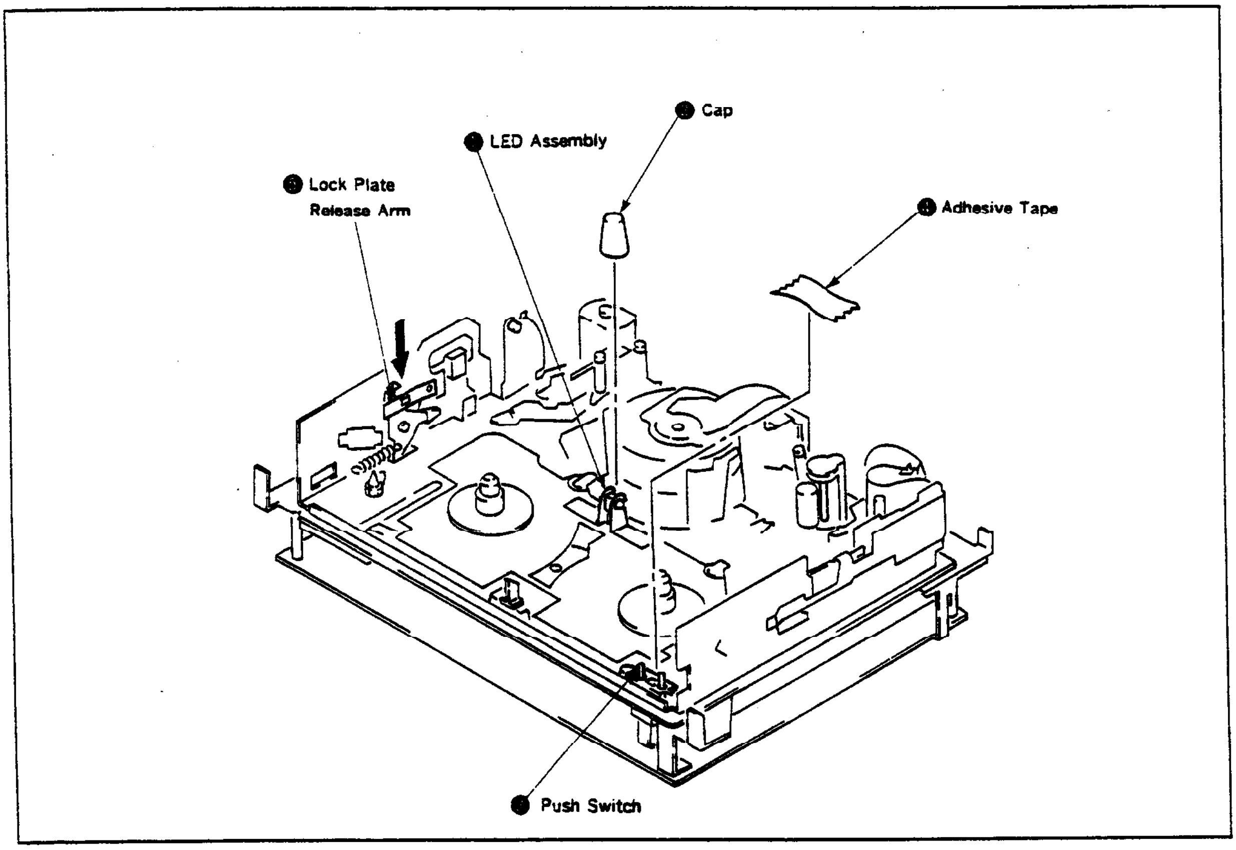


Fig. 3

1-4 HANDLING OF MODE SELECTOR

- Mount the MODE SELECTOR III panel to the mode selector. U, FL, O and O' mechanisms have different mode indications respectively. Select your disired type. (Fig. 4)

1. Construction (Fig. 5)

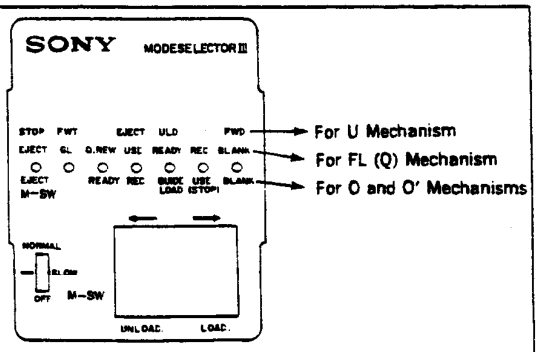
2. Connection (Fig. 6)

For CCD-VII/V88

1) Remove the plate, ornamental ●.
2) Remove the screw ●, and then, the LB-12 board ●.
3) Remove the FP-114 flexible connector ● and loading motor connector ●, and insert them into the MODE SELECTOR III conversion connector respectively.
4) Insert the M-SW connector of the mode selector into the MODE SELECTOR III conversion connector.

3. Handling

1) Use the M mode selector buttons only.
2) During mode selection. "BLANK" lights up when no mode is being selected.
3) If the right M mode selector button is kept pressed, EJECT, USE, GL, Q.REW, GL, REC and READY light up in that order.
4) When changing over from the READY mode back to the EJECT mode, press the left M mode selector button to select your desired mode.


SONY
MODESELECTOR III
STOP FWT EJECT ULD FWD
EJECT GL Q.REW USE READY REC BLANK
EJECT READY REC GUIDE LOAD USE (STOP) BLANK
M-SW
NORMAL
SLOW
OFF
M-SW
UNLOAD.
LOAD.
For U Mechanism
For FL (Q) Mechanism
For O and O' Mechanisms

Ref. No. J-13 MODE SELECTOR III Panel

Fig. 4

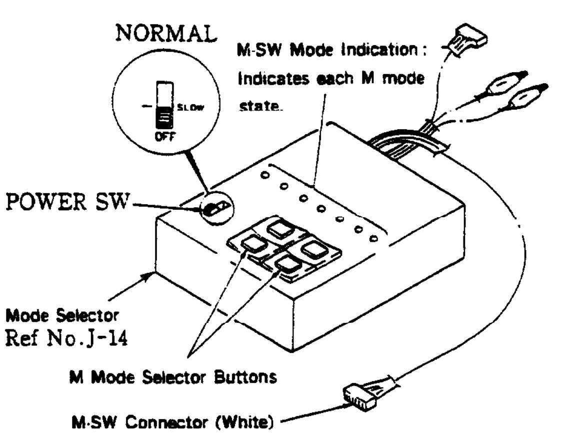

NORMAL
SLOW
OFF
M-SW Mode Indication : Indicates each M mode state.
POWER SW
Mode Selector
Ref No.J-14
M Mode Selector Buttons
M-SW Connector (White)

Fig. 5

For CCD-V11/V88

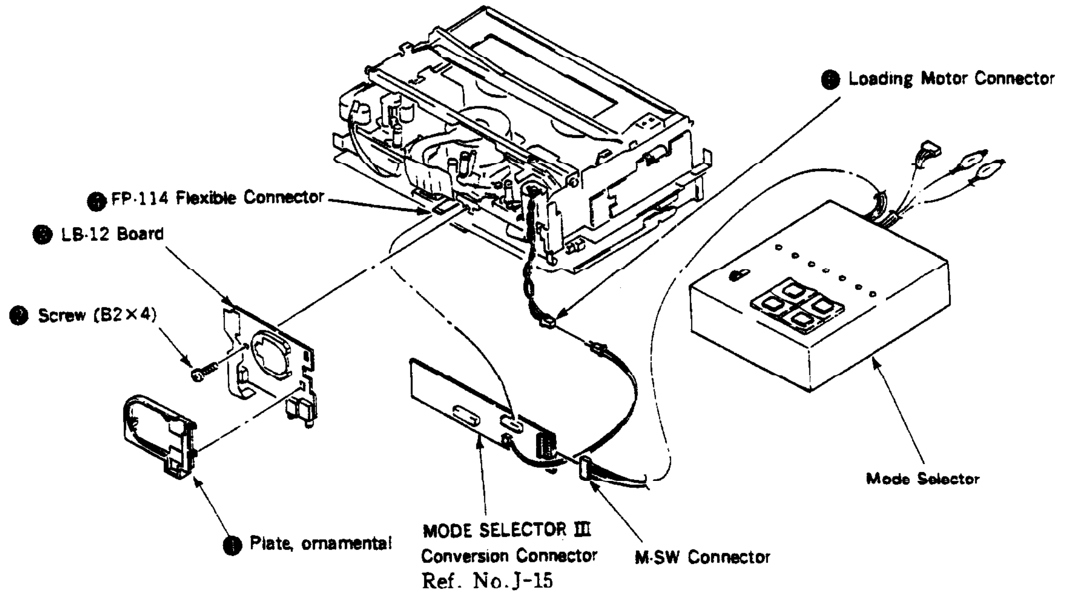
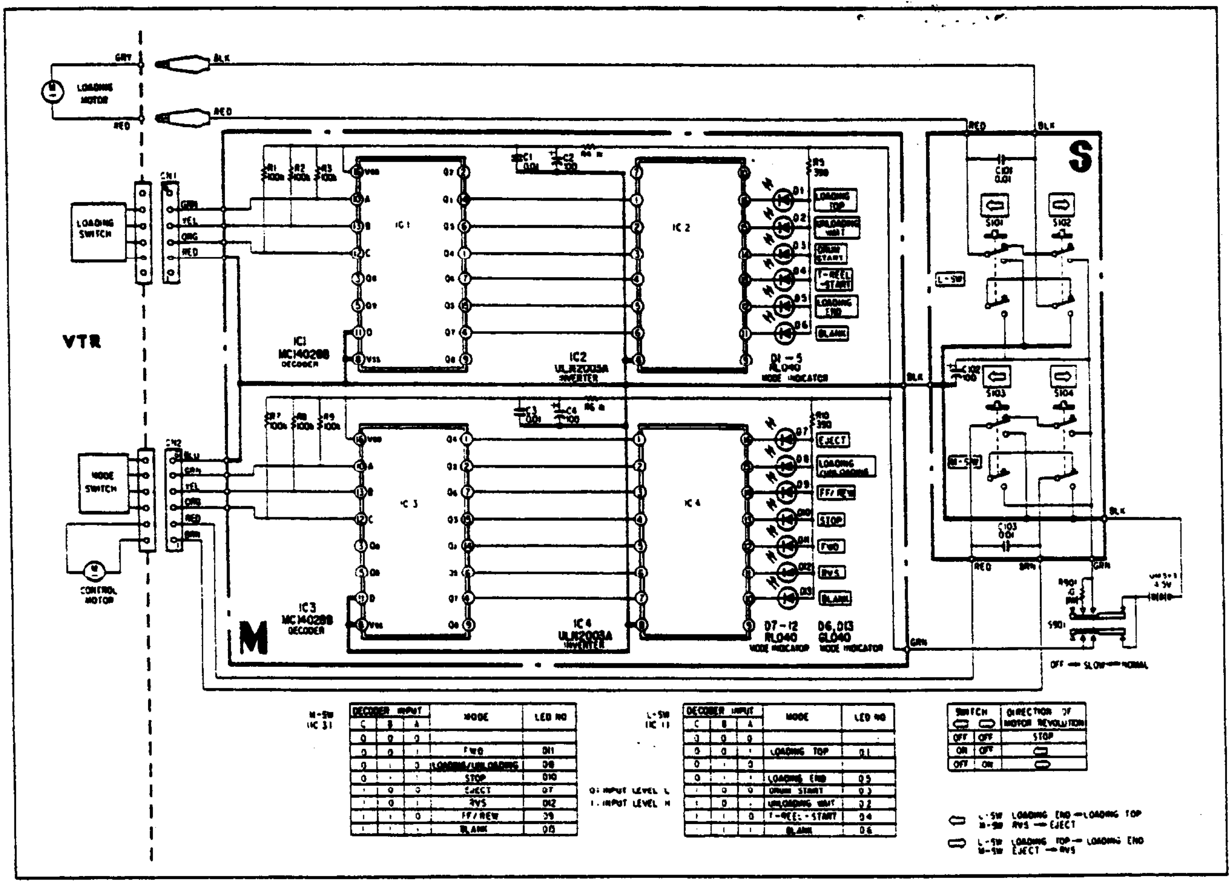

● Loading Motor Connector
● FP-114 Flexible Connector
● LB-12 Board
● Screw (B2×4)
● Plate, ornamental
MODE SELECTOR III
Conversion Connector
Ref. No.J-15
M-SW Connector
Mode Selector

Fig. 6

1-5 MODE SELECTOR SCHEMATIC DIAGRAM


GRY
BLK
LOADING MOTOR
RED
CN1
GRN
YEL
ORG
RED
LOADING SWITCH
VTR
CN2
BLU
GRN
YEL
ORG
RED
BRN
MODE SWITCH
CONTROL MOTOR
R1 100k
R2 100k
R3 100k
C1 0.01
C2 100
R4 1k
IC1
IC1 MC14028B DECODER
IC2
IC2 ULN2003A INVERTER
R5 390
D1
D2
D3
D4
D5
D6
LOADING TOP
UNLOADING WAIT
DRUM START
T-REEL START
LOADING END
BLANK
D1-5 RL040 MODE INDICATOR
R7 100k
R8 100k
R9 100k
C3 0.01
C4 100
R6 1k
IC3
IC3 MC14028B DECODER
IC4
IC4 ULN2003A INVERTER
R10 390
D7
D8
D9
D10
D11
D12
D13
EJECT
LOADING/UNLOADING
FF/REW
STOP
FWD
RVS
BLANK
D7-12 RL040 MODE INDICATOR
D6, D13 GL040 MODE INDICATOR
M
S
RED
BLK
C101 0.01
S101
S102
L-SW
C102 100
S103
S104
M-SW
C103 0.01
BLK
RED
BRN
GRN
R901
S901
OFF → SLOW → NORMAL

M-SW (IC 3)

DECODER INPUT			MODE	LED NO
C	B	A		
0	0	0		
0	0	1	FWD	D11
0	1	0	LOADING/UNLOADING	D8
0	1	1	STOP	D10
1	0	0	EJECT	D7
1	0	1	RVS	D12
1	1	0	FF/REW	D9
1	1	1	BLANK	D13

0: INPUT LEVEL L
1: INPUT LEVEL H

L-SW (IC 1)

DECODER INPUT			MODE	LED NO
C	B	A		
0	0	0		
0	0	1	LOADING TOP	D1
0	1	0		
0	1	1	LOADING END	D5
1	0	0	DRUM START	D3
1	0	1	UNLOADING WAIT	D2
1	1	0	T-REEL-START	D4
1	1	1	BLANK	D6

SWITCH		DIRECTION OF MOTOR REVOLUTION
⇦	⇨	
OFF	OFF	STOP
ON	OFF	⇦
OFF	ON	⇨

⇦ L-SW LOADING END → LOADING TOP
M-SW RVS → EJECT

⇨ L-SW LOADING TOP → LOADING END
M-SW EJECT → RVS

1-6 MODE SELECTOR PARTS LIST

Ref. No	Part No.	Description			
		CAPACITOR			
C1	1-108-579-00	MILER	0.01μF	50V	
C2	1-123-333-00	ELECT	100μF	24V	
C3	1-108-579-00	MILER	0.01μF	50V	
C4	1-123-333-00	ELECT	100μF	24V	
C101	1-108-579-00	MILER	0.01μF	50V	
C102	1-123-333-00	ELECT	100μF	24V	
C103	1-108-579-00	MILER	0.01μF	50V	
		DIODE			
D1	8-719-812-31	DIODE TLR123			
D2	8-719-812-31	DIODE TLR123			
D3	8-719-812-31	DIODE TLR123			
D4	8-719-812-31	DIODE TLR123			
D5	8-719-812-31	DIODE TLR123			
D6	8-719-812-33	DIODE TLG123A			
D7	8-719-812-31	DIODE TLR123			
D8	8-719-812-31	DIODE TLR123			
D9	8-719-812-31	DIODE TLR123			
D10	8-719-812-31	DIODE TLR123			
D11	8-719-812-31	DIODE TLR123			
D12	8-719-812-31	DIODE TLR123			
D13	8-719-812-33	DIODE TLG123A			

Ref. No	Part No.	Description		
		IC		
IC1	8-752-240-28	IC TC4028BP		
IC2	8-752-120-03	IC μPA2003C		
IC3	8-759-240-28	IC TC4028BP		
IC4	8-759-120-03	IC μPA2003C		
		RESISTOR		
R1	1-247-179-00	CARBON	100K	1/4W
R2	1-247-179-00	CARBON	100K	1/4W
R3	1-247-179-00	CARBON	100K	1/4W
R4	1-247-131-00	CARBON	1K	1/4W
R5	1-247-121-00	CARBON	390	1/4W
R6	1-247-131-00	CARBON	1K	1/4W
R7	1-247-179-00	CARBON	100K	1/4W
R8	1-247-179-00	CARBON	100K	1/4W
R9	1-247-179-00	CARBON	100K	1/4W
R10	1-247-121-00	CARBON	390	1/4W
R901	1-214-594-00	METAL	10	1W

2. PERIODIC CHECK AND MAINTENANCE

- Carry out the following maintenance and periodic checks in order not only to fully exhibit the functions and performance of the set, but also for the equipment and tape. After repairing, service the set as follows, regarless of the length of use.

2-1 CLEANING OF ROTARY DRUM ASSEMBLY

1) Gently apply chamois cloth (Ref. No. J-2) soaked in cleaning liquid (Ref. No. J-1) to the rotary drum assembly.
   Clean it by rotating the upper rotary drum assembly slowly counterclockwise by hand.

Note : Do not rotate the motor by power or rotate the upper rotary drum assembly clockwise by hand. Also, the head tip is highly likely to be damaged if the chamois cloth is moved in a pependicular direction to the it. Make sure to follow the instructions above for cleaning the rotary drum assembly.

2-2 CLEANING OF TAPE PATH (Fig. 7)

1) In the EJECT mode, clean the tape running system (TG-1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, pinch roller, and capstan shaft) and the lower drum, using a superfine applicator (Ref. No. J-3) soaked in the cleaning liquid.

Note : Note that no oil or grease of each link mechanism adheres to the superfine applicator (Ref. No. J-3).

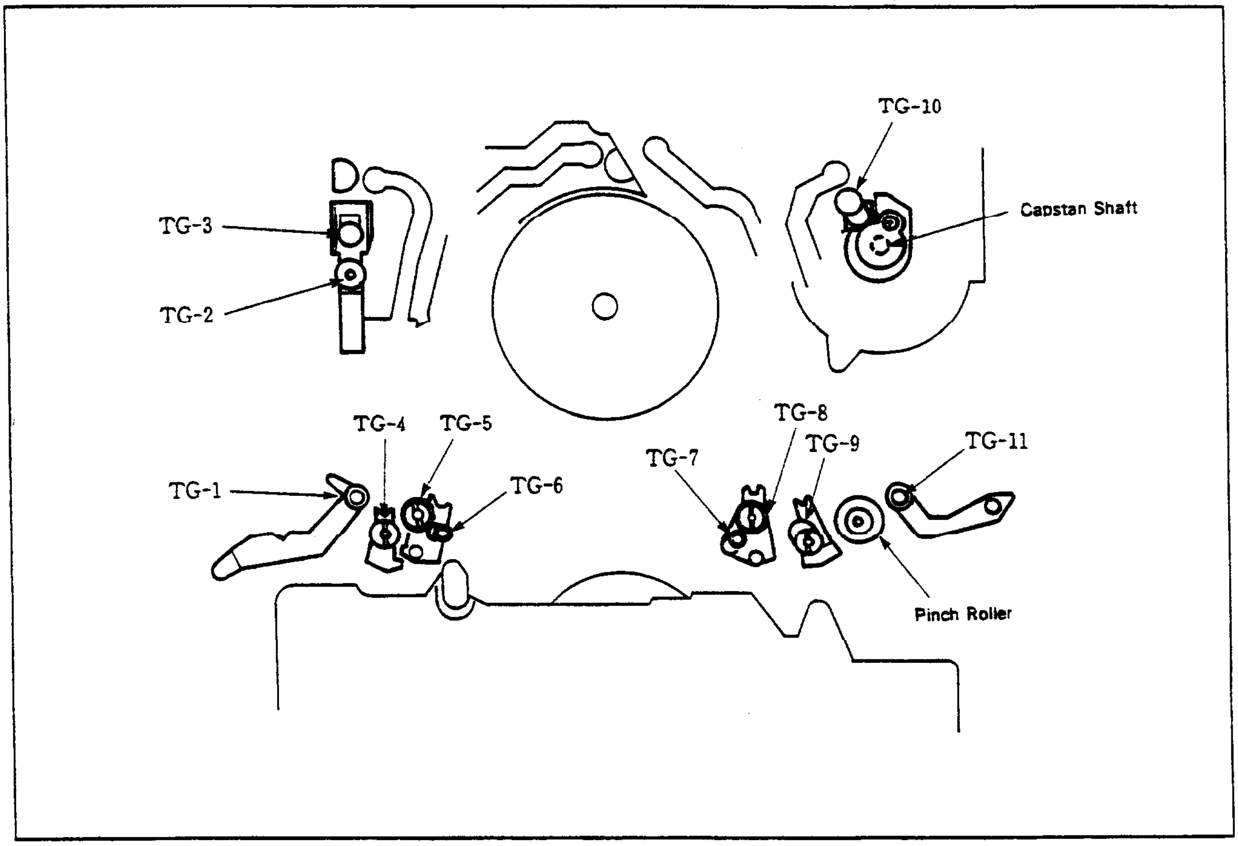


Fig. 7

2-3 PERIODIC CHECK ITEMS

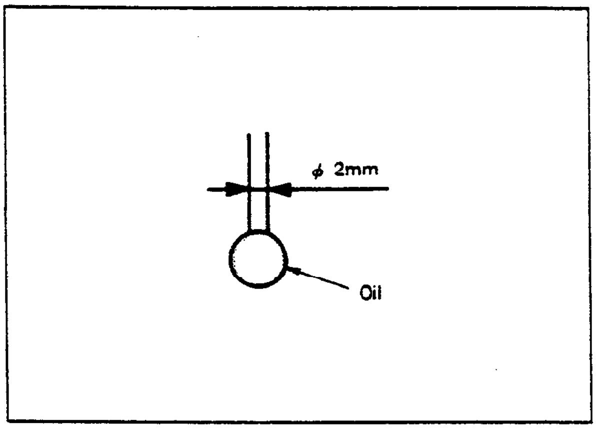
	Location of Maintenance and check	Hours of Use (H)										Remarks
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape trans-portion System	Cleaning of tape path surface	○	○	○	○	○	○	○	○	○	○	Be careful of oil
	Cleaning and degaussing of rotary assembly	○	○	○	○	○	○	○	○	○	○	Be careful of oil
Driving System	Relay belt	—	☆	—	☆	—	☆	—	☆	—	☆	3-728-212-01
	Capstan shaft	—	◎	—	◎	—	◎	—	◎	—	◎	Be adsolutely careful not to get oil on the tape path surface.
	Relay pulley sheft	—	◎	—	◎	—	◎	—	◎	—	◎	
	Loading motor	—	☆	—	☆	—	☆	—	☆	—	☆	1-541-607-11
Performance Confirmation	Abnormal noise	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
	Back tension measurement	—	☆	—	☆	—	☆	—	☆	—	☆	
	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
	FWD. RVS torque measurement	—	☆	—	☆	—	☆	—	☆	—	☆	

○ : Cleaning ◎ : Oil ☆ : Confirmation

Note : When overhauling, refer to the items above to replace parts.

Note : Concerning oil

- Be sure to use specified oil. (If you use oil with different visicosity, etc., it may cause troubles.)
  Oil : Part No. 7-661-018-18 (Mitsubishi Diamond Oil Hydrofluid NT-68)
- When lubricating bearings, be sure use oil free from dust, etc. (If you use oil with dust, etc. contained, it may cause bearings to be worn out or seized.)
- A drip of oil refers to an amount attached to the tip of a ϕ 2mm stick shown in the right figure.

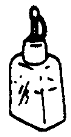


2-4 Service jigs list

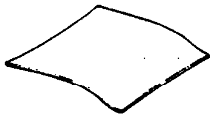
Ref. No.	Neme	Part No.	Fixture No.	Usage and Others
J-1	Cleasing fluid	Y-2031-001-0	—	
J-2	Cleasing cloth	2-034-697-00	—	
J-3	Super fine applicator (Made by NIPPON APPLICATOR, P752D)		—	
J-4	Head degausser	Widely available	—	
J-5	Small mirror for adjustment Spare mirror	J-6080-029-A J-6080-030-1	SL-5052	Tape path
J-6	Alignment tape NTSC (WR5-1N) PAL (WR5-1C)	8-967-995-01 8-967-995-06		Tape path
J-7	Dial tension gauge	J-6080-827-A		Various torque measurement
J-8	Tension measurement reel	J-6080-831-A		With ϕ30 tape
J-9	FWD and RVS winding torque cassette	J-6080-824-A	GD-2086	
J-10	Drum screwdriver (Hexagonal wrench screwdriver)	7-700-766-01		
J-11	Screwdriver for tape path	J-6082-026-A		For tape guide adjustment
J-12	Mode selector Ⅲ panel	J-6082-023-A		
J-13	Mode selector	J-6080-825-A		For all models
J-14	Mode selector Ⅲ conversion connector	J-6082-021-A		

Other equipment
- Oscilloscope
- Analog tester (20kΩ)

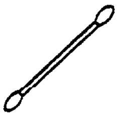
J-1



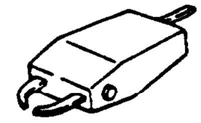
J-2



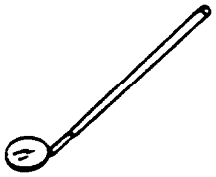
J-3



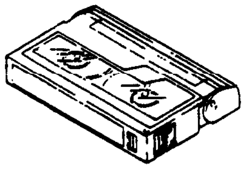
J-4



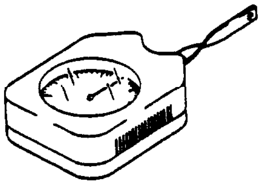
J-5



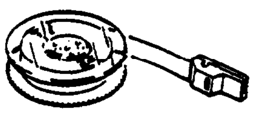
J-6



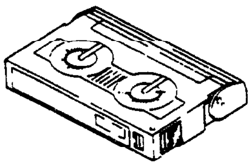
J-7



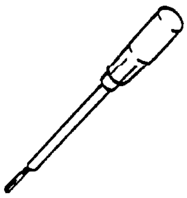
J-8



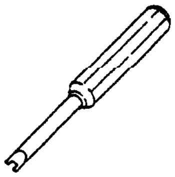
J-9



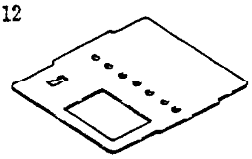
J-10



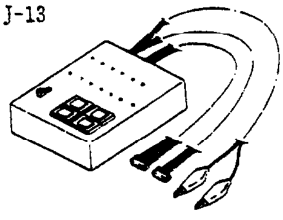
J-11



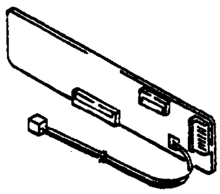
J-12



J-13



J-14



3. MECHANICAL CHECK, ADJUSTMENT AND REPLACEMENT

Note : Use the mode selector (Ref. No. J-14) for the following mechanical checks, adjustments and replacements.

Note : The modes in ☐ are those set by pressing the mode selector buttons.

3-1 LED BASE (Fig. 8)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder assembly.
3) As shown in Fig. A, rotate the LED in a direction of the arrow Ⓐ and remove it in a direction of the arrow Ⓑ.
4) Remove the three screws ●, ● and ●.
5) Lifting the LED base ●, remove it by pushing it in a direction of the arrow Ⓒ.

Note : Dismount and remount the LED base carefully, because its holder is easily deformed.

2. Mounting

1) Select the USE mode.
2) Put the claw ● of the LED base ● in the notch ● of the LS chassis without catching the LED in between. Next, fit to the dowels ● at 2 places.
3) Mount and tighten the screws ●, ● and ● in that order.
4) As shown in Fig. B, set the LED in a direction of the arrow Ⓐ and rotate it in a direction of the arrow Ⓑ to fix.
5) As shown in Fig. C, bend a flexible boord and put it in the holder.

Note : In the step2), make sure that the barring ● of the arm assy, gear can appears in the hole of the LED base. (Fig. D)

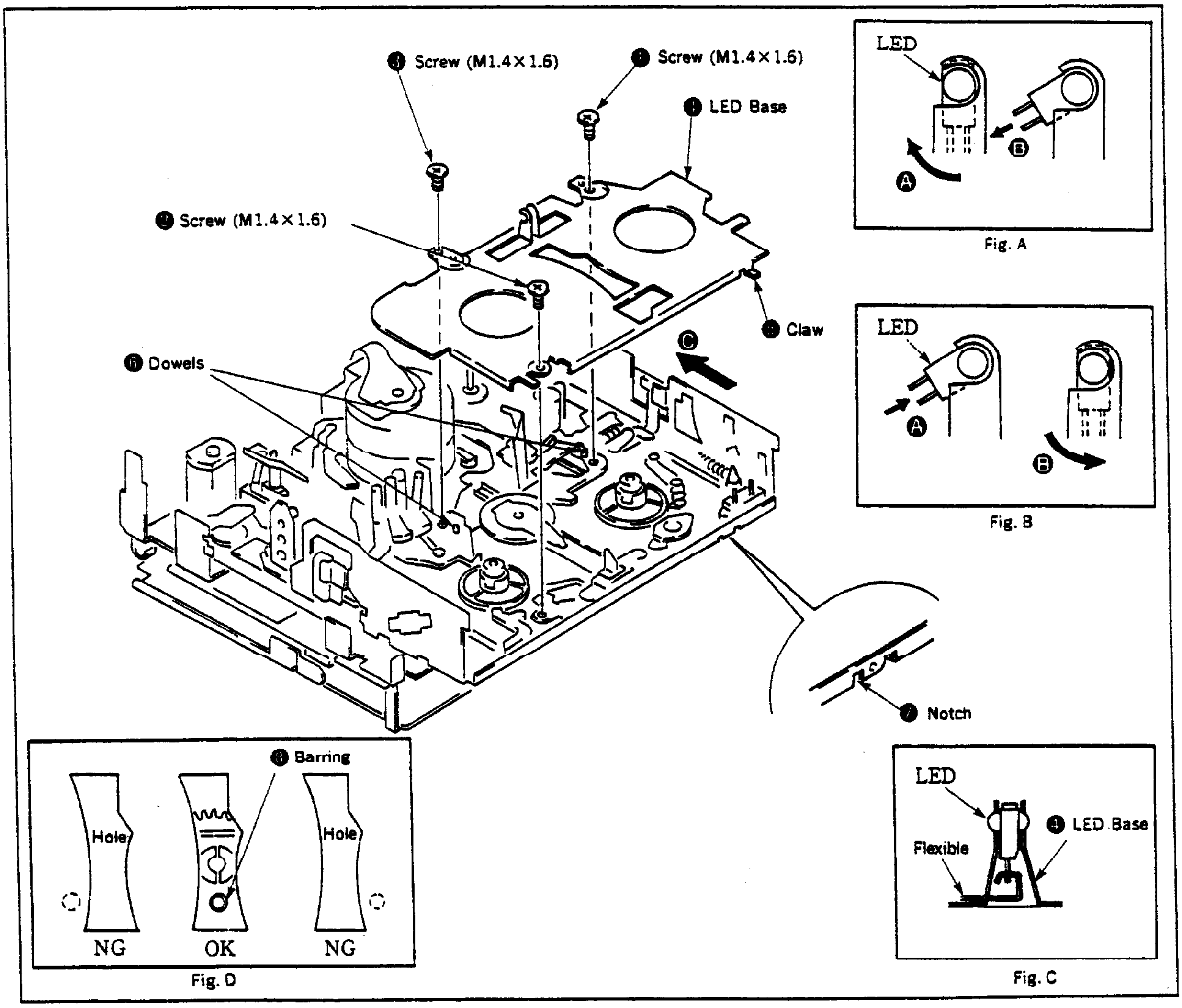


Fig. A

Fig. B

Fig. D

Fig. C

Fig. 8

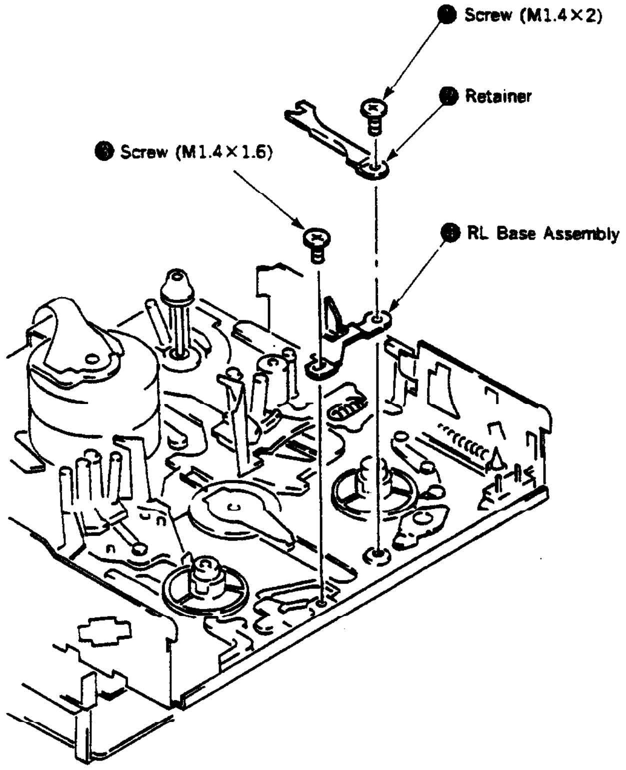
3-2 RL BASE ASSEMBLY, RETAINER (Fig. 9)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder assemlby.
3) Referring to 3-1, remove the LED base.
4) Remove the screw ●, and then, retainer ●.
5) Remove the screw ●, and then, RL base assembly ●.

2. Mounting

1) Select the USE mode.
2) With the screw ●, mount the RL base assembly ● to the LS chassis.
3) With the screw ● fix the retainer ● to the RL base assembly ●.
   When this is done, align the bump part ⁕ of the retainer ● with the bump part ⁕ of the guide rail T. (Fig. A)
4) Referring to 3-1, mount the LED base.
5) Referring to 1-1, mount the cassette compartment holder assembly.


● Screw (M1.4×2)
● Retainer
● Screw (M1.4×1.6)
● RL Base Assembly

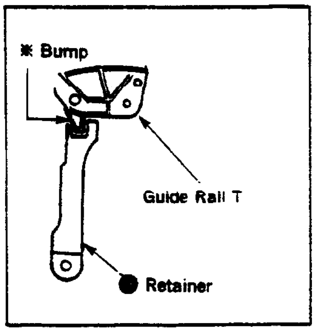

⁕ Bump
Guide Rail T
● Retainer

Fig. A

Fig. 9

3-3 TABLE ASSY, REEL, SUPPLY (Fig. 10)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder assembly.
3) Referring to 3-1, remove the LED base.
4) As shown in Fig. A, making use of slackness of the tension regulator string ● in the USE mode, remove the string out of the groove of the table assy, reel, supply ●. When this is done, be careful not to bend the tension regulator string ● and the S soft arm ● must be moved in a direction of the arrow Ⓑ.
5) Remove the table assy, reel, supply ●.

Note : Dismount and remount the table assy, reel, supply ●, holding the reel claw ✱.

2. Mounting

1) Select the USE mode.
2) As shown in Fig. B, move the S soft arm ● in a direction of the arrow Ⓑ.
3) Avoiding the tension regulator string ●, mount the table assy, reel, supply ● to the shaft ●.
4) Put the tension regulator string ● in the groove of the table assy, reel, supply ● and fit it properly by turning the table assy, reel, supply ●.
5) Referring to 3-1, mount the LED base.
6) Referring to 1-1, mount the cassette compartment holder assembly.

Note : Do not touch the tension regulator string ● with naked hand. Also, be careful of adhesion of grease, etc.

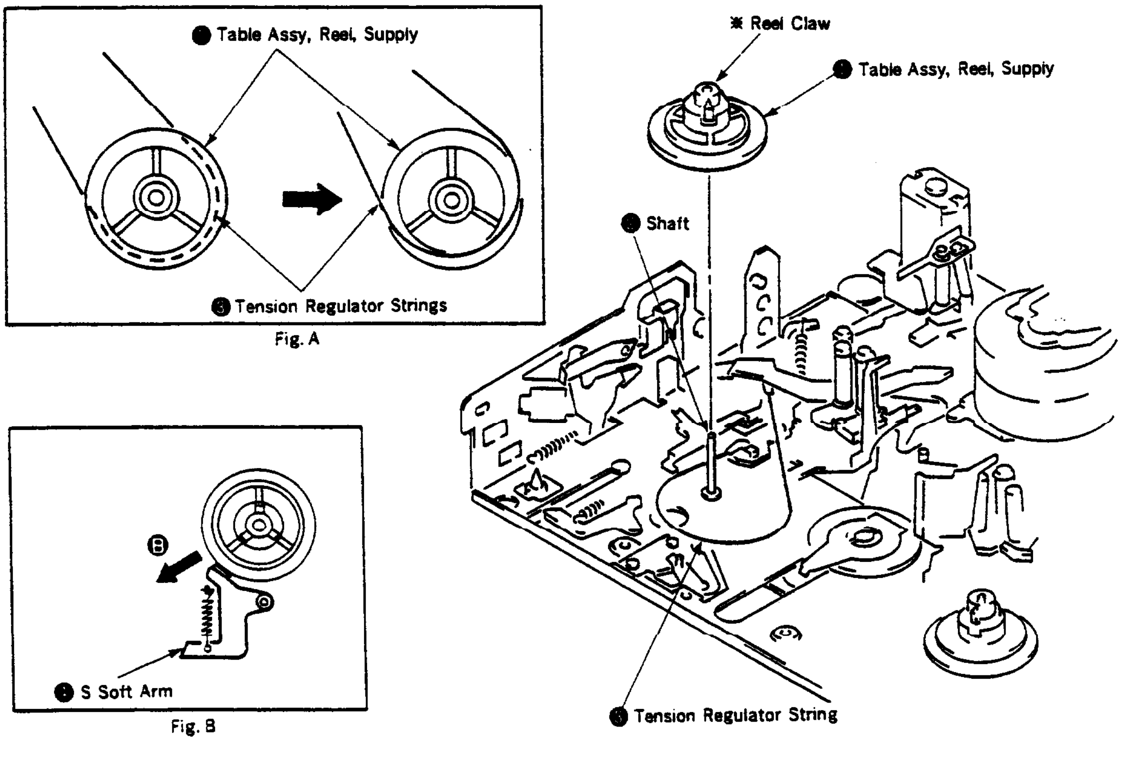

● Table Assy, Reel, Supply
● Tension Regulator Strings
Fig. A
Ⓑ
● S Soft Arm
Fig. B
✱ Reel Claw
● Table Assy, Reel, Supply
● Shaft
● Tension Regulator String

Fig. 10

3-4 TABLE ASSY, REEL, TAKE-UP (Fig. 11)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder assembly.
3) Referring to 3-1, remove the LED base.
4) Referring to 3-2, remove the retainer.
5) Dispace the T ratchet ❶ in a direction of the arrowⒶ.
6) With the claw (T ratchet head) of the T ratchet ❶ moved in a direction of the arrowⒷ, remove the Table assy, reel, take-up ❷.

Note : Dismount and remount the Table assy, reel, take-up ❷, holding the reel claw ※.

2. Mounting

1) Select the USE mode.
2) With the claw (T ratchet head) of the T ratchet ❶ moved in an arrow direction, mount the Table assy, reel, take-up ❷ to the shaft ❸.
3) Referring to 3-2, mount the retainer.
4) Referring to 3-1, mount the LED base.
5) Referring to 1-1, mount the cassette compartment holder assembly.

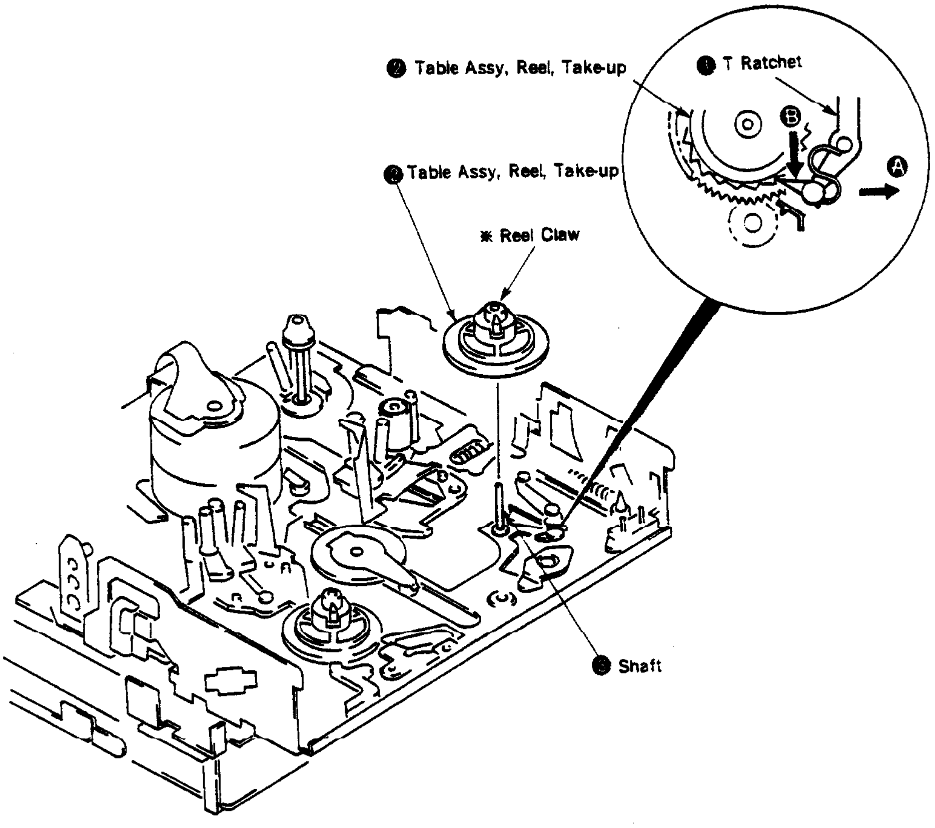


Fig. 11

3-5 ONEWAY CLUTCH ASSEMBLY (Fig. 12)

1. Removal

1) Select the USE mode.
2) Referring to the cassette compartment holder assembly.
3) Referring to 3-1, remove the LED base.
4) Remove the screw ●, and then, oneway clutch assembly ●.

2. Mounting

1) Select the USE mode.
2) Mount the oneway clutch assembly ● to the LS chassis and fix with the screw ●.
3) Referring 3-1, mount the LED base.
4) Referring to 1-1, mount the cassette compartment holder assembly.

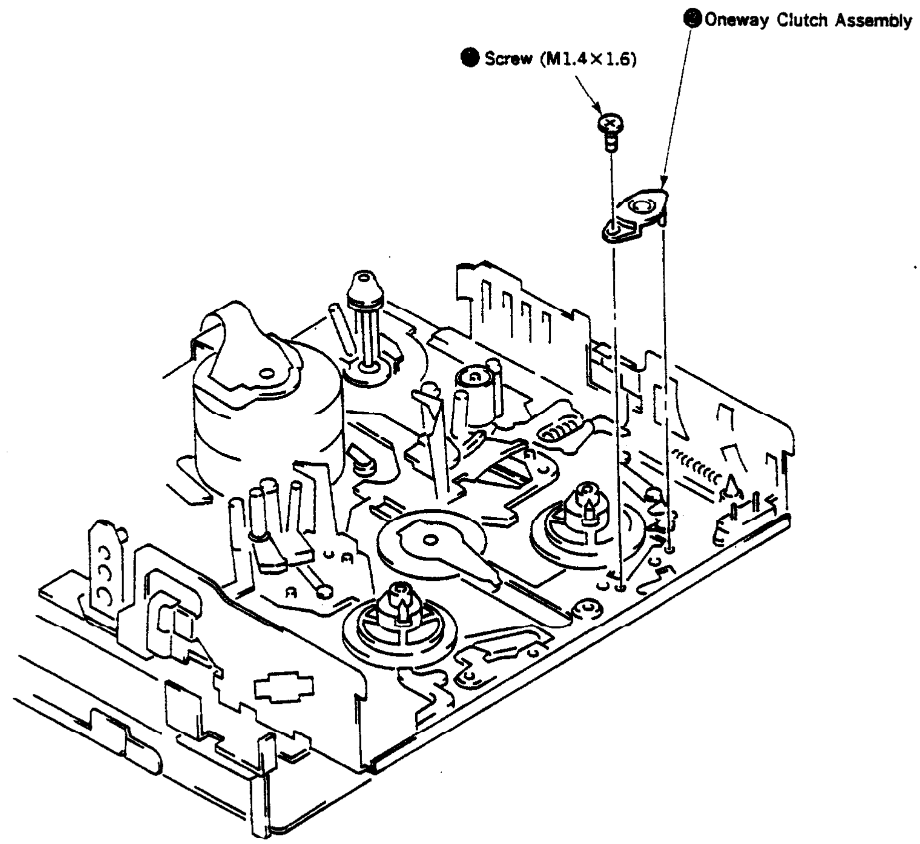


Fig. 12

3-6 S SOFT ARM ASSEMBLY (Fig. 13)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder assembly.
3) Referring to 3-1, remove the LED base.
4) Rerove the lock washer ●, and then, the spring, tension ●.
5) Remove the S soft arm assembly ● by rotating it in an arrow direction (until the hook ● comes off the LS chassis).

2. Removal

1) Select the USE mode.
2 As shoms in Fig. A, apply a quarter drip of oil to the arrowindicated part of the shaft ●.
3) Mount the S soft arm assembly ● to the shaft ●, rotating it in as arrow direction. (Be careful not to bend the hook ●.)
4) Hook the spring, tension 2 onto the claw and fix it with lock washer 1.
5) Referring to 3-1, mount the LED base.
6) Referring to 1-1, mount the cassette compartment holder assembly.

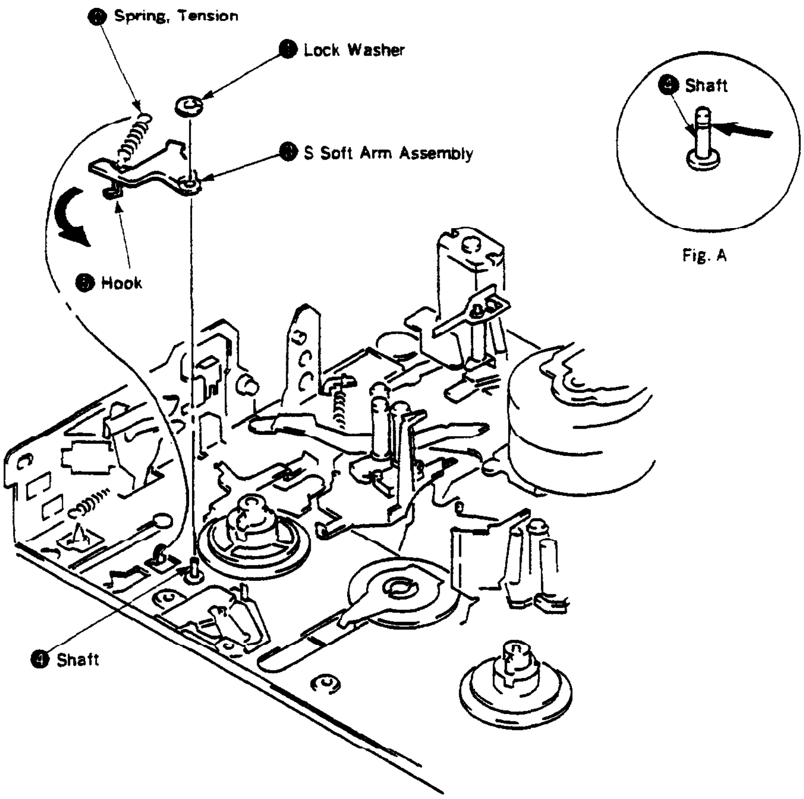


Fig. 13

3-7 LS CHASSIS ASSEMBLY (Fig. 14)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder.
3) Referring to 3-1, remove the LED base.
4) Referring to 3-2, remove the RL base assembly and retainer.
5) Remove the lock washer ❶, and then, arm assy gear ❷.
6) Select the Q, REW mode.
7) Remove the flexible rotary shaft ❸, and then, the flexible connector ❹.
8) Remove the E retaining ring ❺ and three screws ❻.
9) Remove the LS chassis assembly ❼ in a direction of the arrow Ⓓ.

2. Mounting

1) As shown in Fig. A, apply Molyton grease to the arrow-indicated part of the LS chassis assembly ❼.
2) Unload in the RDY mode. Start docking in the Q, REW mode after first GL. When docking the mechanical chassis and LS chassis assembly ❼, it is necessary to place the following parts at specified positions.
3) Put the pin ●of the pinch arm assembly ●into the left side of the pinch press arm assembly●. (Fig.19)
4) Move the TG-1 arm assembly●in a direction of the arrow Ⓐ to put the pin ●into the concave of the arm assembly ●. (Fig. 17)
5) put the pin●of the S ratchet●into the right side the of the arm assembly●. (Fig. 17)

Simultaneously performing the operations above, push the roller of the guide lock arm ● With the arm arc portion of the guide arm T assembly● (Fig. 15) to push the LS chassis assembly ❼ in a direction of the arrow Ⓔ, and at the same time, engage the claws of the guide rail base 1●, guide rail base 2●and guide rail base3●with those of the guide rail S● and guide rail T●. (Fig. 16)

Then, align the shafts ❾ of the mechanical chassis With the four long joints of the LS chassis assembly ❼, and put the LS pin●of the LS arm assembly●in the groove of the LS cam plate●. (Fig.18)

Note : Before docking, confirm that both EJ arm and LS arm are deeply inserted into the shafts. (If not properly fit, the set does not function even if the LS chassis is docked.

6) Mount the E retaining ring ❺ and three screws ❻.
7) Mount the flexible rotary shaft ❸ and flexible connector ❹.
8) Select the USE mode.
9) Mount the arm assy gear ❷ and fix with the lock washer ❶.
10) Referring to 3-2, mount the RL base assembly and retainer.
11) Referring to 3-1, mount the LED base.
12) Referring to 1-1, mount the cassette compartment holder assembly.

Note : Using the mode selector, confirm that loading and unloading are performed smoothly.

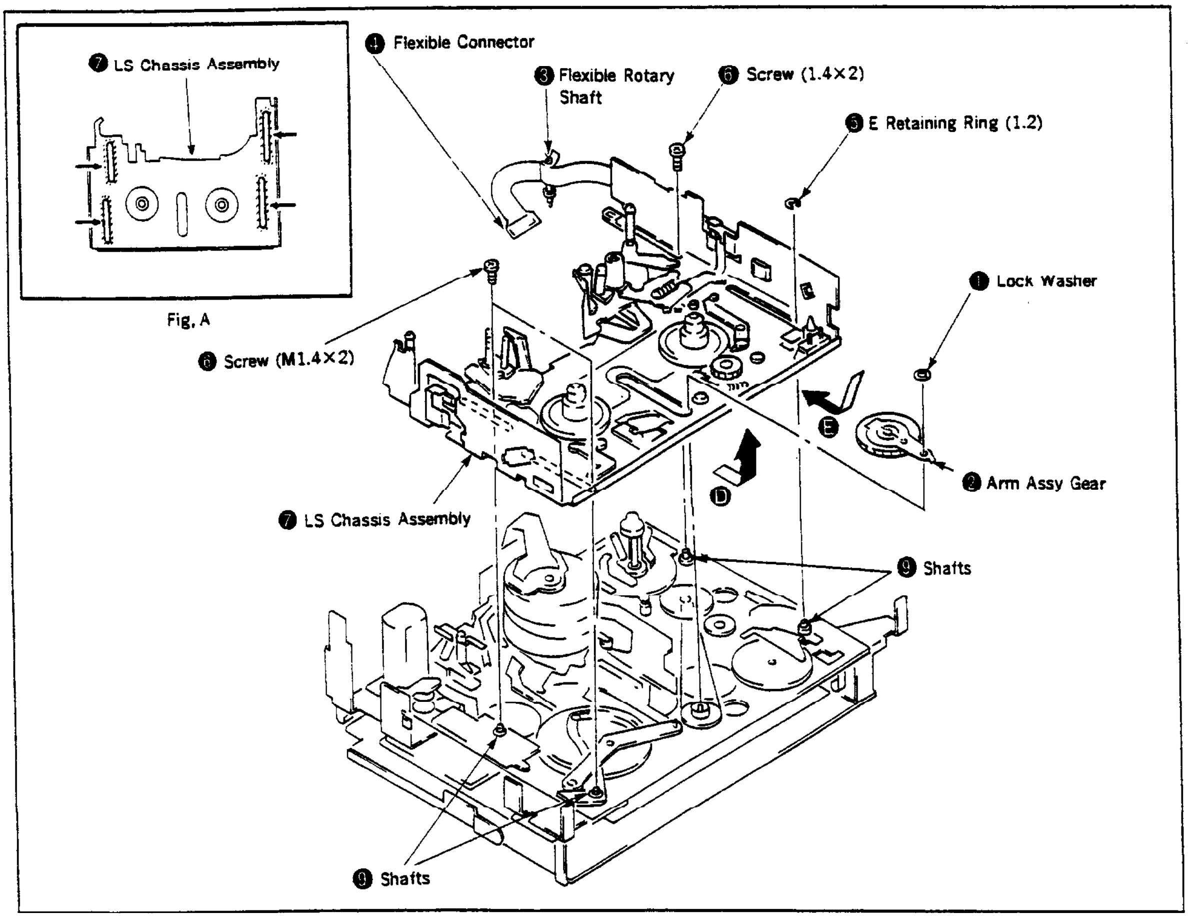


Fig. 14

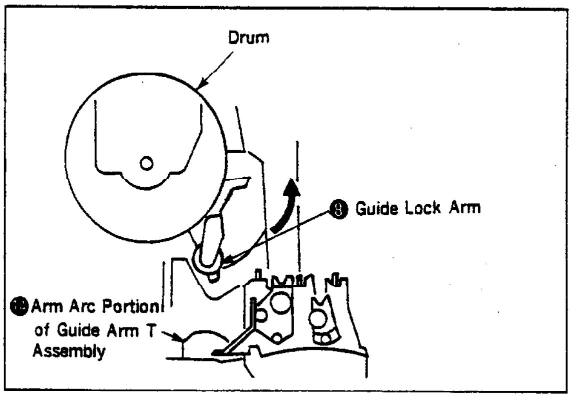

Drum
⑧ Guide Lock Arm
Arm Arc Portion of Guide Arm T Assembly

Fig. 15

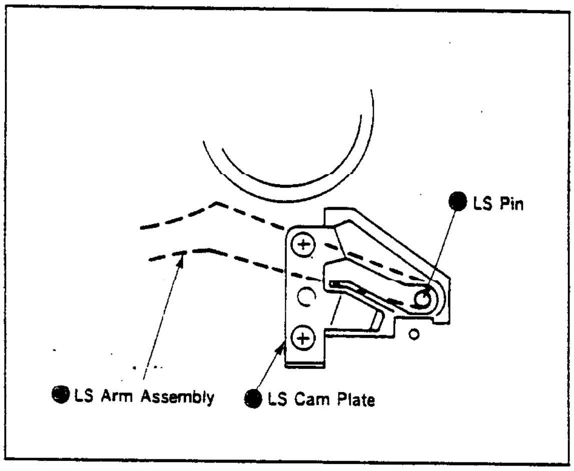

LS Pin
LS Arm Assembly
LS Cam Plate

Fig. 18

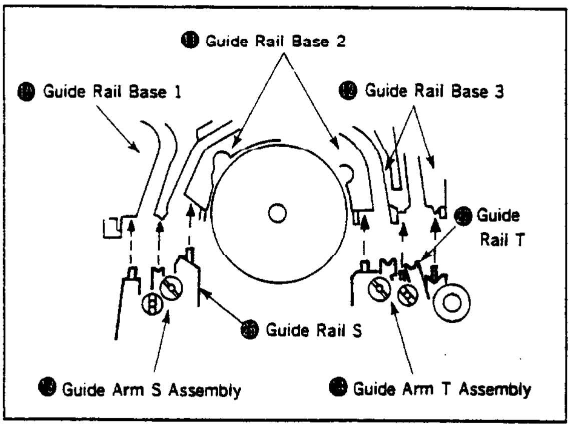

⑪ Guide Rail Base 2
⑩ Guide Rail Base 1
⑫ Guide Rail Base 3
Guide Rail T
Guide Rail S
Guide Arm S Assembly
Guide Arm T Assembly

Fig. 16

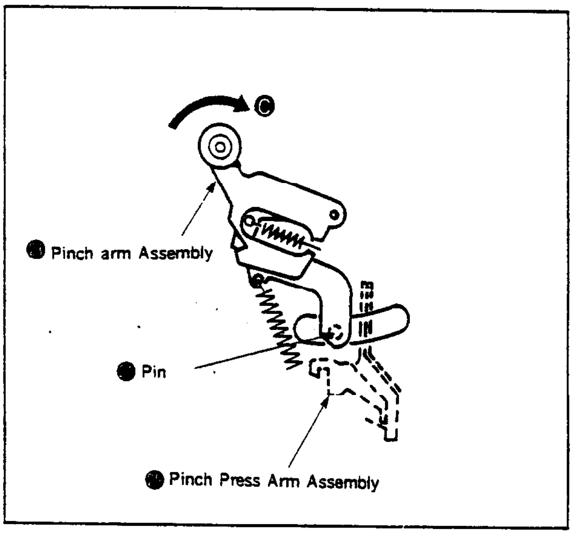

Ⓒ
Pinch arm Assembly
Pin
Pinch Press Arm Assembly

Fig. 19

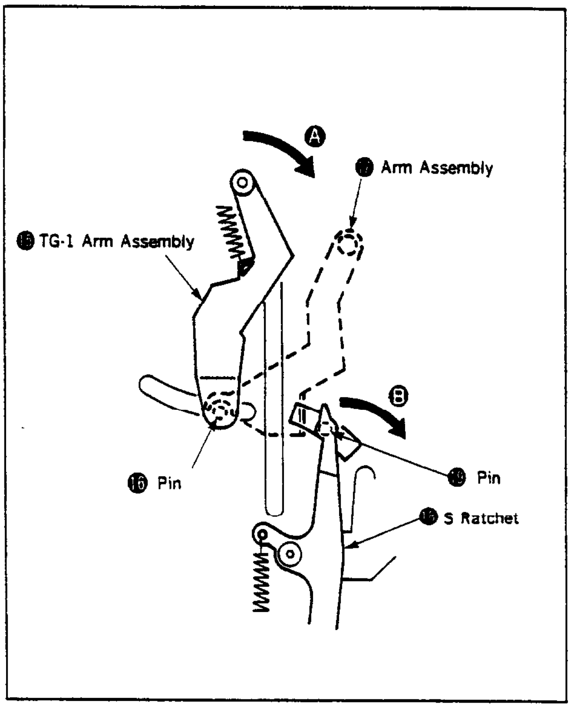

Ⓐ
Arm Assembly
TG-1 Arm Assembly
Ⓑ
Pin
Pin
S Ratchet

Fig. 17

-8 PINCH ARM ASSEMBLY (Fig. 20)

. Removal

) Referring to 1-1, remove the cassette compartment holder assembly.

) Referring to 3-7, remove the LS chassis assembly.

) Remove the lock washer ❷ from the back of the LS chassis assembly ❶.

) Remove the spring, tension ❸, and then, pinch arm assembly ❹.

2. Mounting

1) As shown in Fig. A, apply oil to the hole of the boss ❺ over one third of a drip up to half a drip.
2) put the rotation center of the pinch arm assembly in the boss ❺ hole, and the pin ❻ in the long hole.
3) Hook the spring, tension ❸ onto the upper groove of the pinch return spring shaft ❼.
4) Mount the lock washer ❷ from the back of the LS chassis assembly ❶.
5) Referring to 3-7, mount the LS chassis assembly.
6) Referring to 1-1, mount the cassette compartment holder assembly.

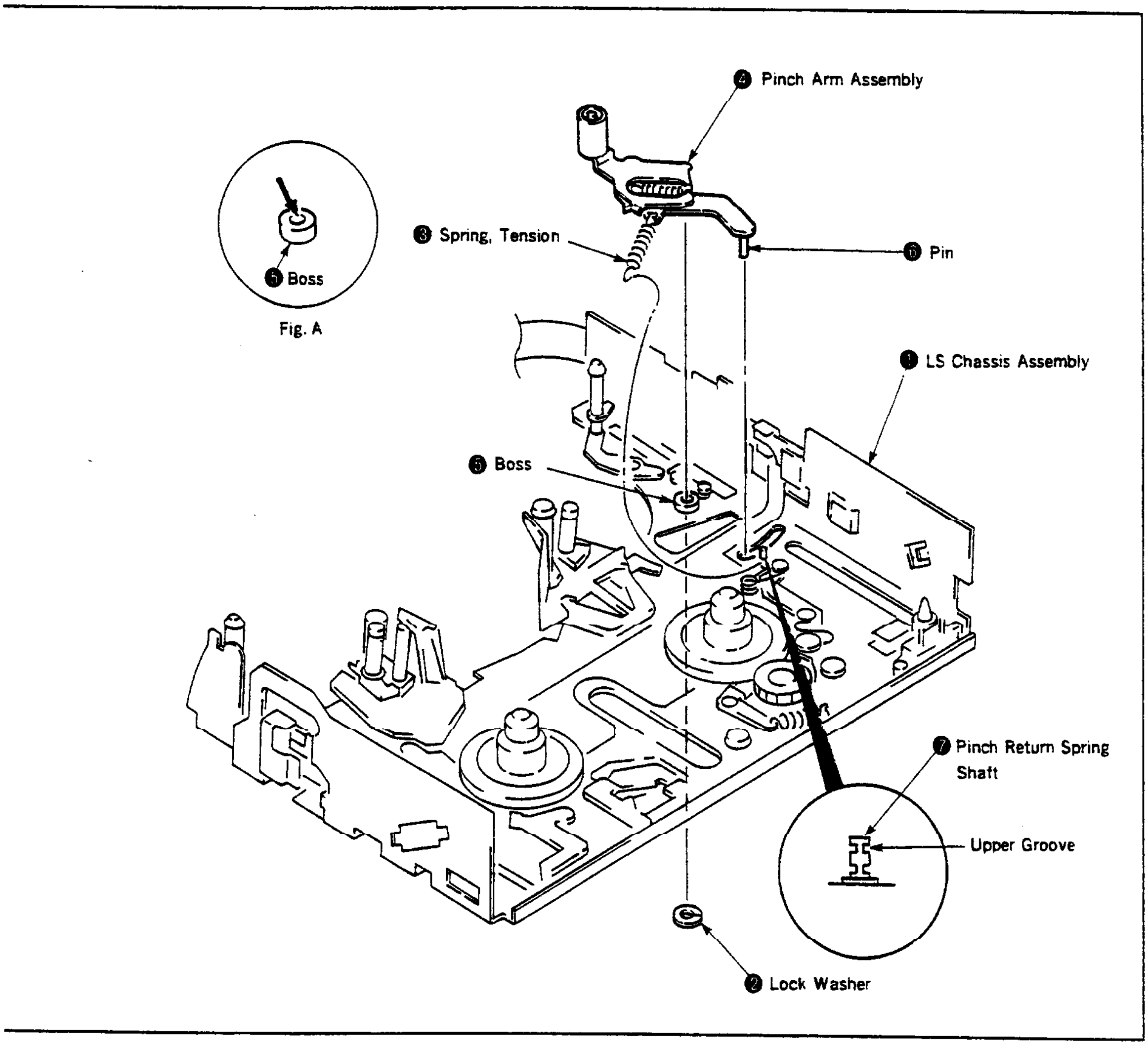

❹ Pinch Arm Assembly
❸ Spring, Tension
❻ Pin
❺ Boss
Fig. A
❶ LS Chassis Assembly
❺ Boss
❼ Pinch Return Spring Shaft
Upper Groove
❷ Lock Washer

Fig. 20

3-9 TG-11 ARM ASSEMBLY (Fig. 21)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis assembly.
3) Remove the lock washer ❷ from the back of the LS chassis assembly ❶.
4) Remove the TG-11 arm assembly ❸ and spring, torsion ❹.

Note : Be careful not to deform the TG-11 arm.

2. Mounting

1) As shown in Fig. A, apply oil to a boss hole over one third of a drip up a half a drip.
2) As shown in Fig. B, put the longer arm of the spring, torsion ❹ between the pinch arm boss ❺ and cam slider shaft ❽ of the LS chassis. Next, Hook the shorter arm of the spring, torsion ❹ around the pin ❻ of the TG-11 arm assembly ❸, rotate the TG-11 arm assembly and fix with the lock washer ❷. When this is done, see to it that the pin ❻ of the TG-11 arm assembly ❸ is located to the left side of the cam slider ❾ as shown in Fig. C.
3) Referring to 3-7, mount the LS chassis.
4) Referring to 1-1, mount the cassette compartment holder.

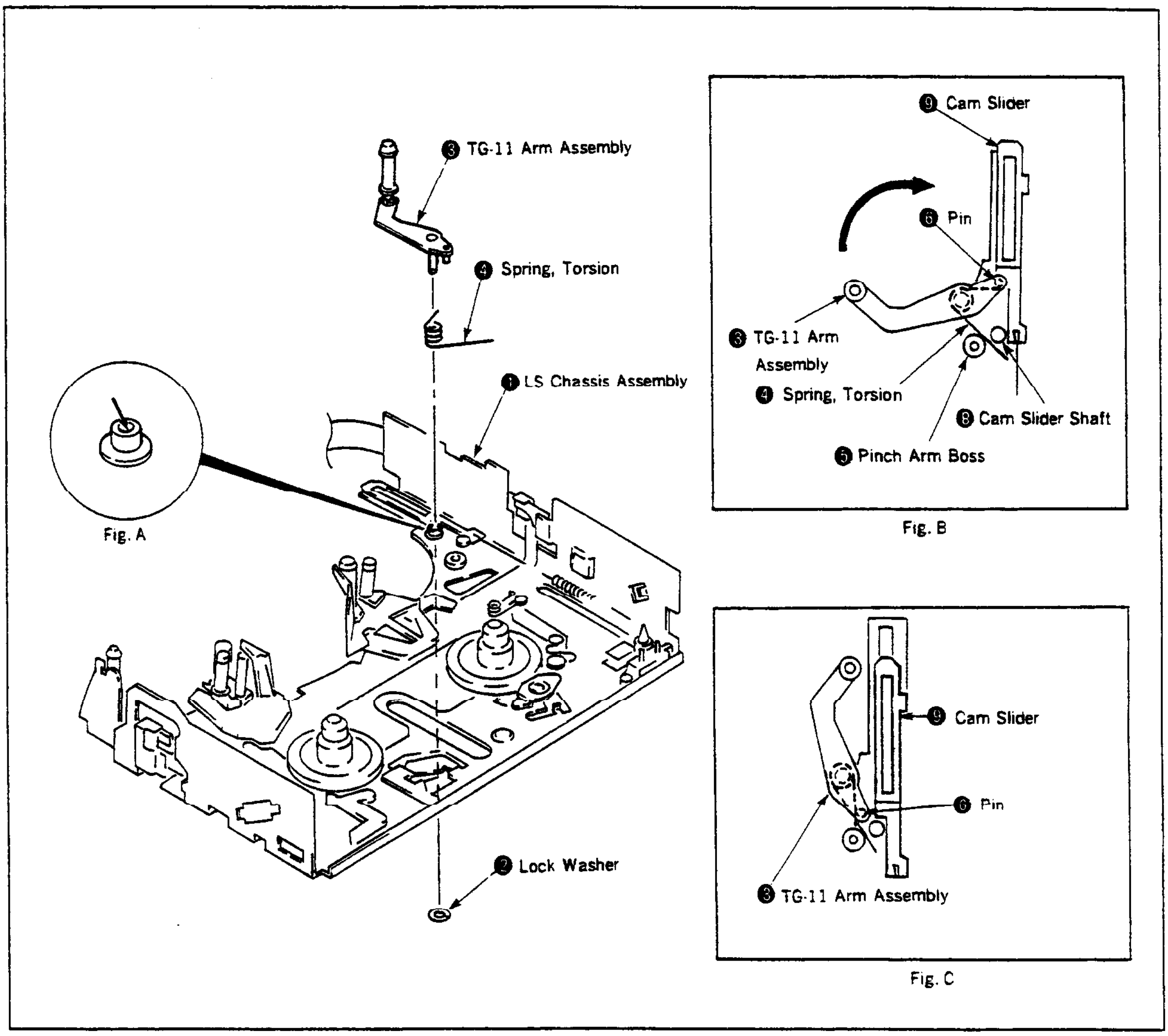

❸ TG-11 Arm Assembly
❹ Spring, Torsion
❶ LS Chassis Assembly
❷ Lock Washer
❾ Cam Slider
❻ Pin
❸ TG-11 Arm Assembly
❹ Spring, Torsion
❽ Cam Slider Shaft
❺ Pinch Arm Boss
❾ Cam Slider
❻ Pin
❸ TG-11 Arm Assembly

Fig. A

Fig. B

Fig. C

Fig. 21

3-10 TG-1 ARM ASSEMBLY (Fig. 22)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis.
3) Referring to 3-3, remove the table assy, reel, supply.
4) Remove the lock washer ❷ from the back of the LS chassis assembly ❶.
5) Remove the spring, tension ❸. Remove the string joint ❹ from the dowel ❺ of the TG-1 adjustment block ❾ by rotating it in a direction of the arrow Ⓐ as shown in Fig. C.
6) Remove the TG-1 arm assembly ❻.

Note : Dismount and remount the string joint ❹ carefully not to deform it.

2. Mounting

1) As shown in Fig. A, apply oil to the hole of the boss ❼ over one third of a drip up to half a drip.
2) As shown in Fig. C, mount the string joint ❹ to the TG-1 adjustment block ❾ in the opposite direction of the arrow Ⓐ.
3) Mount the TG-1 arm assembly ❻ to the boss ❼ in such a manner not to touch the guide and insert the pin ❽ into the long hole.
4) Hook the spring, tension ❸ onto the position shown in Fig. B.
5) Mount the lock washer ❷ from the back of the LS chassis assembly ❶.
6) Referring to 3-3, mount the table assy, reel, supply.
7) Referring to 3-7, mount the LS chassis assembly.
8) Referring to 1-1, mount the cassette compartment holder assembly.

Note : Referring to 3-27, adjust a tension regulator position.

Note : Referring to 3-28, adjust a FWD back tension.

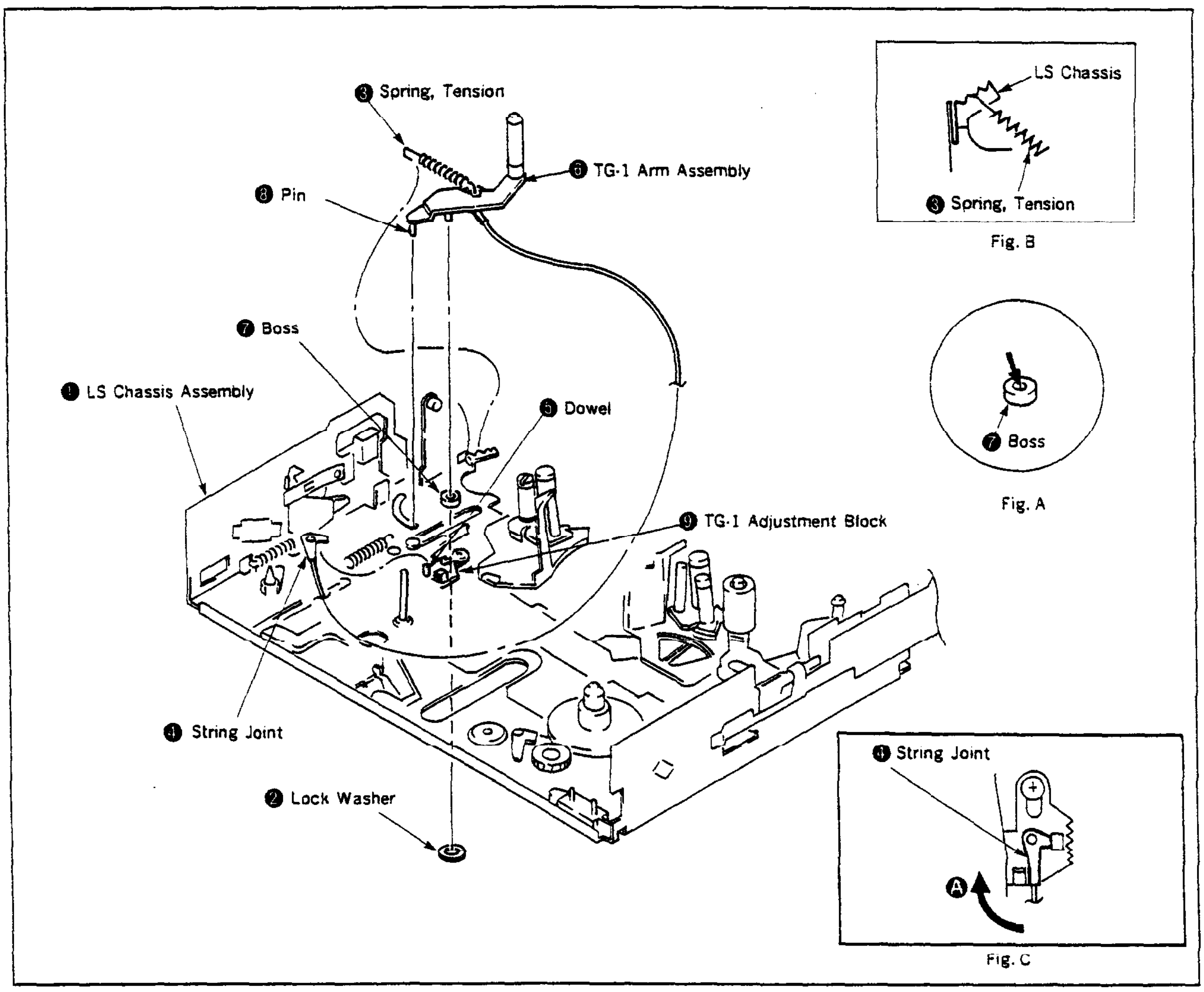

❸ Spring, Tension
❻ TG-1 Arm Assembly
❽ Pin
❼ Boss
❶ LS Chassis Assembly
❺ Dowel
❾ TG-1 Adjustment Block
❹ String Joint
❷ Lock Washer
LS Chassis
❸ Spring, Tension
❼ Boss
❹ String Joint
Ⓐ

Fig. B

Fig. A

Fig. C

Fig. 22

3-11 STRING JOINT (Fig. 23)

1. Removal

1) Referring to 3-10, remove the TG-1 arm assembly ❶.
2) Remove the joint holder ❷, and then, string assembly ❸.

2. Mounting

1) Put the dowel ❹ of the TG-1 arm assembly ❶ into the hole of the string assembly ❸ and mount the joint holder ❷. (Apply screw lock between the joint holder and TG-1 arm assembly.)
2) Referring to 3-10, mount the TG-1 arm assembly ❶.

Note : Be careful not to bend the string assembly ❸.

Note : Do not touch the guide ✱.

Note : The joint holder ❷, which was removed once, must not be used again.

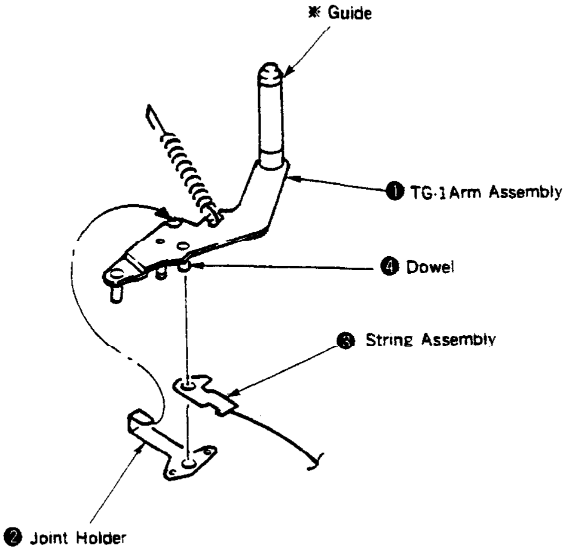

✱ Guide
❶ TG-1 Arm Assembly
❹ Dowel
❸ String Assembly
❷ Joint Holder

Fig. 23

3-12 GUIDE ARM T ASSEMBLY, GUIDE ARM S ASSEMBLY

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove *the LS chassis assembly.*
3) Rotate the guide arm T assembly ❶ and guide arm S assembly in arrow directions respectively, align their shafts ❸ with the holes as shown in Fig. A, and remove them. (Fig. 24)

Note : Do not touch the guide ✱. (Fig. 25 and Fig. 26)

2. Mounting

1) After inserting the guide arn T and S assemblies in the reverse order of removal, rotate them in the opposite directions of the *arrows respectively.*
2) Fit the TG-7 base assembly ❺ and TG-9 base assembly ❻ in the grooves of the guide rail T ❹. (Fig. 25)
3) Put the shaft ❸ flange in the long groove of the guide rail S ❽, and fit the TG-4 base assembly ❾ and TG-6 base assembly ❿ into the right and left grooves of the guide rail S ❽ respectively.

   When this is done, see to it that the flat spring of the TG-6 base assembly❿ is located below the guide rail S ❽ as shown in Fig. B. (Fig.26)
4) Referring to 3-7, mount the LS chassis assembly.
5) Referring to 1-1, mount the cassette compartment holder assembly.

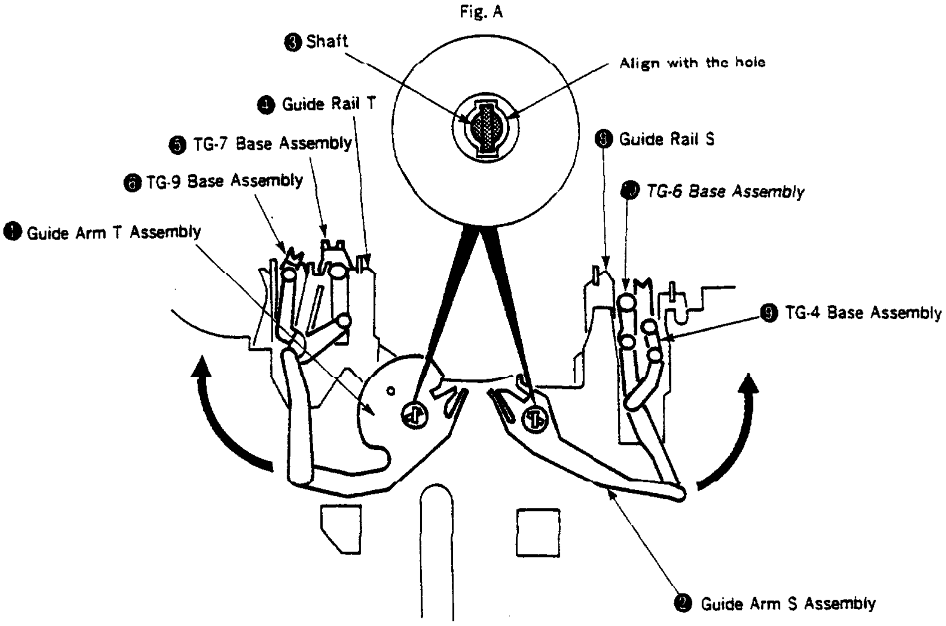


Fig. A
❸ Shaft
Align with the hole
❹ Guide Rail T
❺ TG-7 Base Assembly
❻ TG-9 Base Assembly
❶ Guide Arm T Assembly
❽ Guide Rail S
❿ TG-6 Base Assembly
❾ TG-4 Base Assembly
❷ Guide Arm S Assembly

LS Chassis Assembly Viewed from Back

Fig. 24

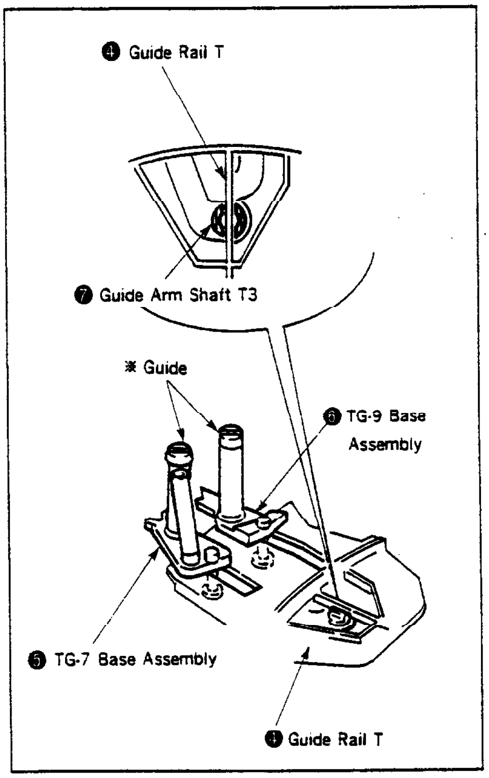

④ Guide Rail T
⑦ Guide Arm Shaft T3
※ Guide
⑥ TG-9 Base Assembly
⑤ TG-7 Base Assembly
④ Guide Rail T

Fig. 25

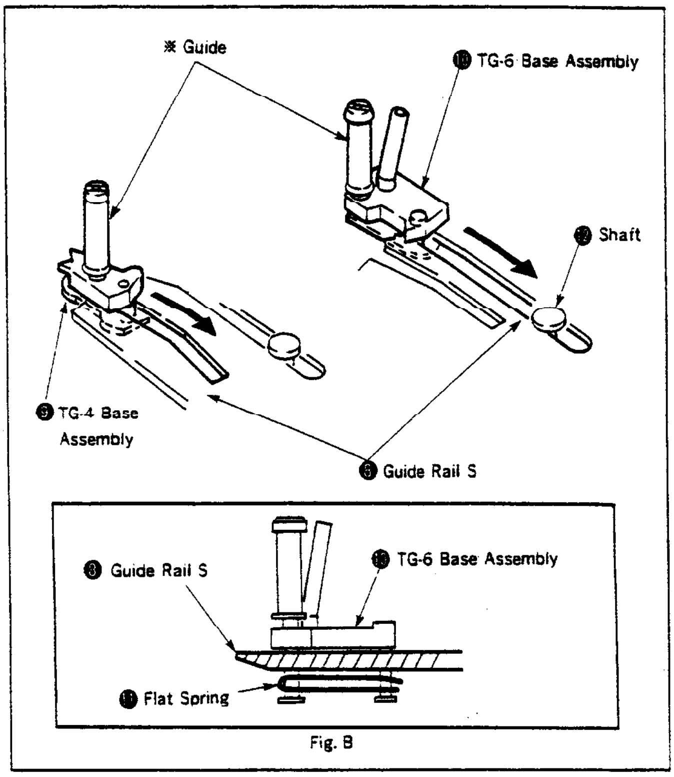

※ Guide
⑩ TG-6 Base Assembly
⑫ Shaft
⑨ TG-4 Base Assembly
⑧ Guide Rail S
⑧ Guide Rail S
⑩ TG-6 Base Assembly
⑪ Flat Spring

Fig. B

Fig. 26

13 PINCH PRESS ARM ASSEMBLY (Fig. 27)

Removal

Referring to 1-1, remove the cassette compartment holder assembly.

Referring to 3-7, remove the LS chassis.

Remove the screw ❶, and then, pinch press arm assembly ❷.

2. Mounting

1) As shown in A, apply half a drip of molyton grease to an arrowindicated part of a boss hole.
2) As shown in Fig. B, apply half a drip of molyton grease each to the pinch press arm assembly ❷ at 3 places.
3) Put the pin ❹ of the pinch press arm assembly ❷ in the groove of the cam B ❸.
4) Fix. with the screw ❶.
5) Referring to 3-7, mount the LS chassis assembly.
6) Referring to 1-1, mount the cassette compartment holder assembly.

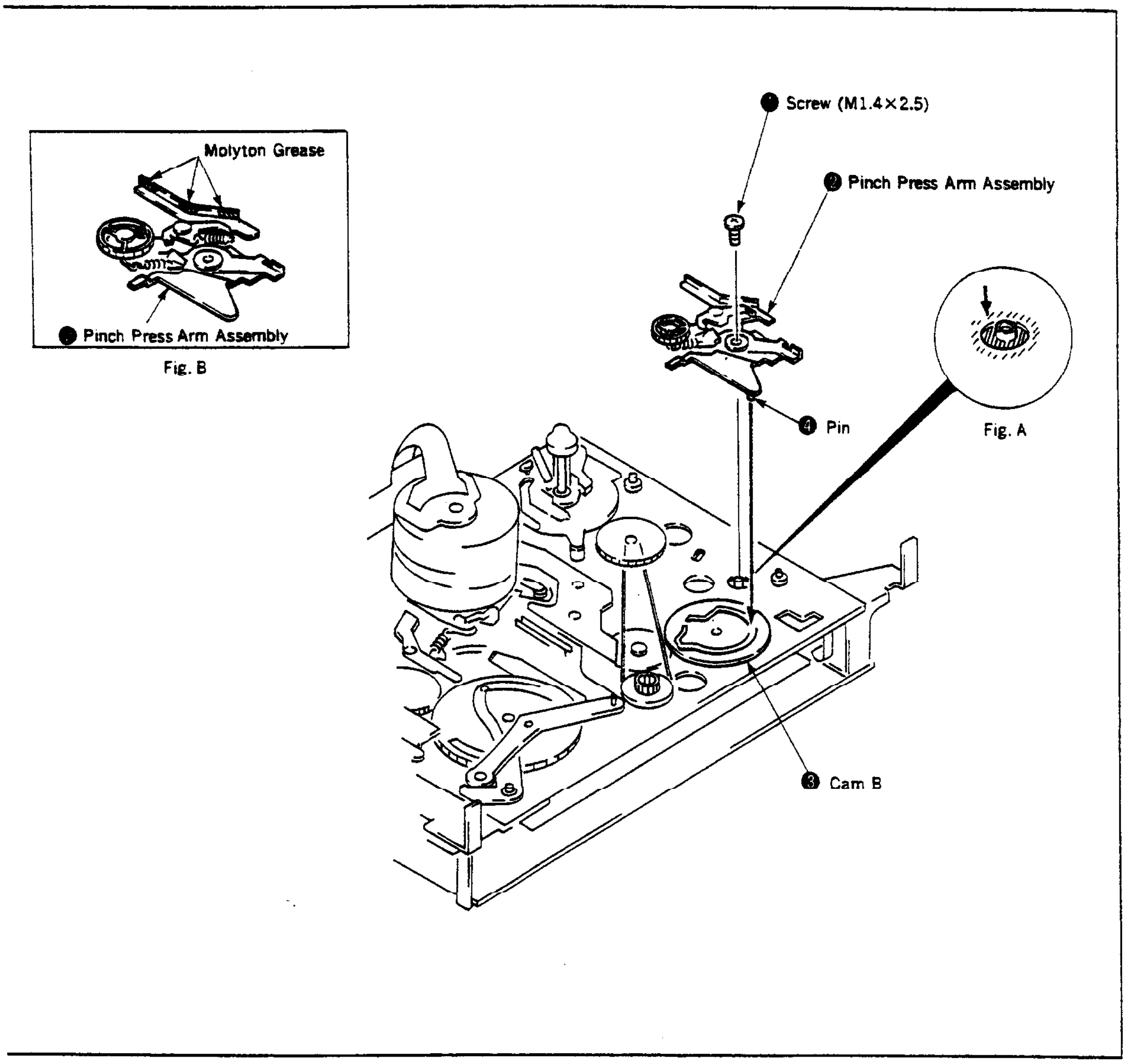

Molyton Grease
❷ Pinch Press Arm Assembly
Fig. B
❶ Screw (M1.4×2.5)
❷ Pinch Press Arm Assembly
❹ Pin
Fig. A
❸ Cam B

Fig. 27

3-14 GL SLIDER ASSEBLY (Fig. 28)

1. Removal

1) Refering to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis assembly.
3) Referring to 3-15, remove the cam A.
4) Shift the GL slider assembly ❹ in a direction of the arrowⒶ.
5) Remove the screw ❶, and then, GL support S ❷.
6) Remove the lock washer ❸, and then, GL slider assembly ❹.

2. Mounting

1) Fit the claw ❺ of the GL slider assembly ❹ in the groove of the GL support T ❼, and put the roller ❻ in the long hole of the chassis.
2) Stop with the lock washer ❸.
3) Shift the GL slider assembly ❹ in a direction of the arrowⒶ.
4) Fit the claw ❽ of the GL support ❷ in the part of the chassis marked with ⋇ and place the dowel ❾ in the hole of the chassis.
5) Fix with the screw ❶.
6) Referring to 3-7, mount the LS chassis assembly.
7) Referring to 1-1, mount the cassette compartment holder assembly.

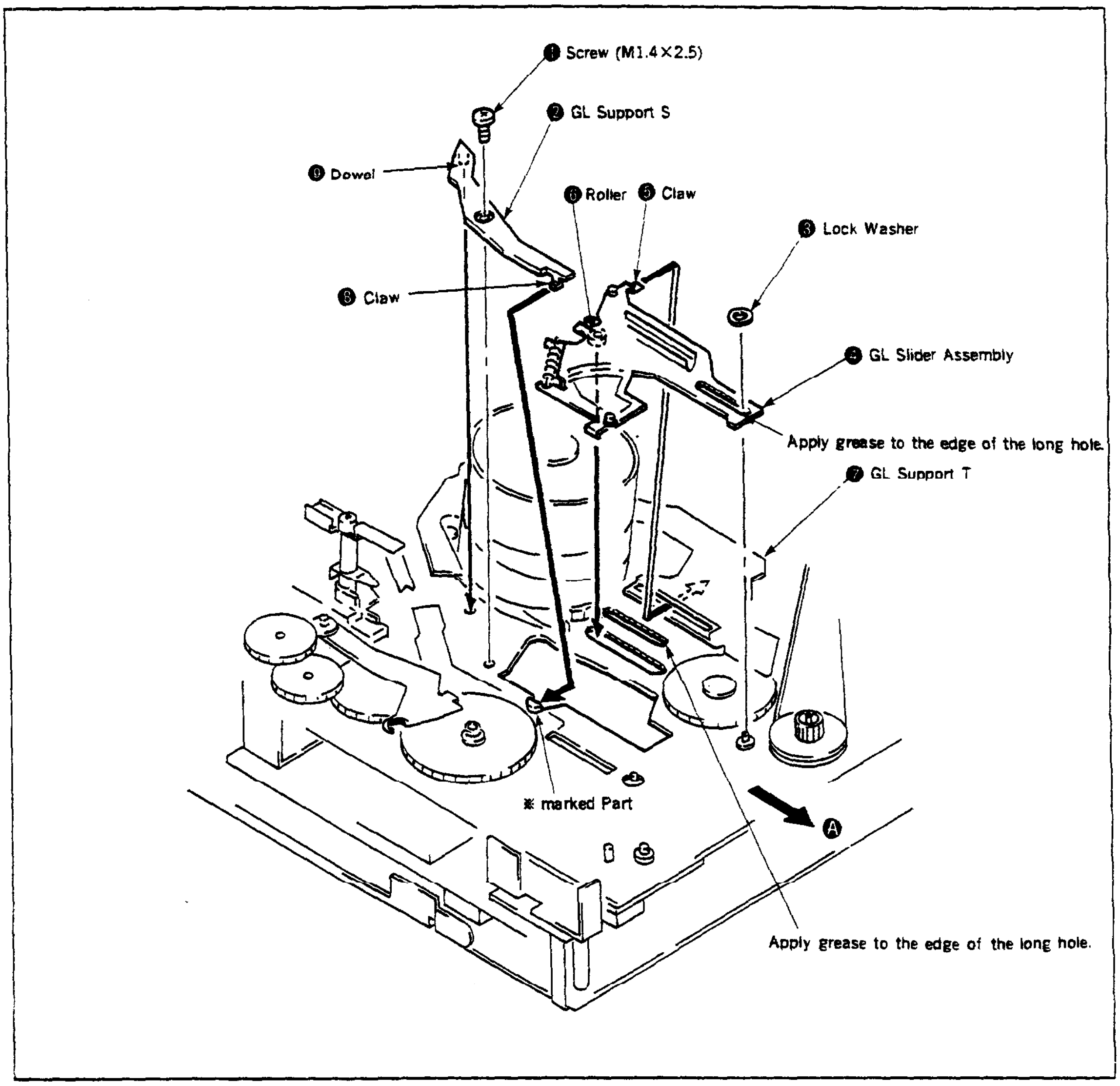

❶ Screw (M1.4×2.5)
❷ GL Support S
❾ Dowel
❻ Roller
❺ Claw
❸ Lock Washer
❽ Claw
❹ GL Slider Assembly
Apply grease to the edge of the long hole.
❼ GL Support T
⋇ marked Part
Ⓐ
Apply grease to the edge of the long hole.

Fig. 28

3-15 PHASE ADJUSTMENT(Fig. 29)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis. (Wen this is done, one of the BLANK, REC and READY modes must be selected.)
3) Remove the two screws ●, and remove the TG-1 cam base ❷ by moving it in a direction of the arrow Ⓐ. (Remove the notch ● from the groove of the No. 3 gear shaft.)
4) Remove the screw ●, and remove the gear retainer ● by sliding it in a direction of the arrow Ⓑ.
5) Remove the arm assembly ●, No. 0 gear ●, No. 1 gear assembly ●, No. 2 gear assembly ●, No. 3 gear assembly ●, lock washer ●, and then, mode gear assembly ●, respectively.
6) Being careful not to lose the LS roller ● of the LS arm, remove the LS arm assembly ● and EJ arm ●, respectively.
7) Remove the screw ●, and then, cam A ●.
8) Referring to 3-13 3), remove the pinch press arm assembly.
9) Remove the screw ●, and then, cam B ●.

2. Adjustment and Mounting

1) Face the hole ⓐ of the mode gear assembly ● to a direction of the arrow Ⓐ, move the GL slider assembly ● in a direction of the arrow Ⓑ, apply molyton grease to the pin of the GL slider assembly ●, and mount the LS roller ●. (Fig. 30)
2) Set a direction of the cam A ● so that the hole Ⓒ of the cam A ● will be aligned with the hole of the mechanical chassis. (Fig. 31)
3) Move the GL slider ● so that the LS roller ● will be placed into the groove ⓓ of the cam A ●. At the same time, engage the mode gear assembly ● with the gear of the relay gear A ●, and mount the cam A ●. Insert a stick of about ϕ1.5mm in the hole Ⓒ of the cam A ●. (Fig. 31)
4) Align the hole ⓔ of the cam B ● with the hoie of the mechanical chassis. At the same time, engage the relay gear B ● with the gear and mount it. (Fig. 32)
5) Referring to 3-13, mount the pinch press arm assembly.
6) Align the hole ⓕ of the No. 3 gear assembly ● with the hole of the mechanical chassis, and at the same time, engage the mode gear assembly ● with the gear to mount. (Fig. 33)
7) Mount the No. 2 gear assembly ●, No. 1 gear assembly ❼ and No. 0 gear ❻ in that order. Mount the arm assembly ❺ to the shaft and put the pin ● in the groove of the No. 3 gear assembly ●, (Fig. 34)
8) Put the TG-1 cam base ❷ in place, fit the notch ● to the shaft and shift it in an arrow direction, and mount the screws ● and ● in that order. (Fig. 35)
9) Put the gear retainer ❹ in place, slide it in an arrow direction and fix it with the screw ●. (Fig. 36)
10) Seeing to it that the EJ arm ● and the LS roller ● of the LS arm assembly ● are put in the groove ⓖ of the cam A ●, mount them in that order. (Fig. 29 and Fig. 30)
11) Referring to 3-7, mount the LS chassis assembly.
12) Referring to 1-1, mount the cassette compartment holder assembly.

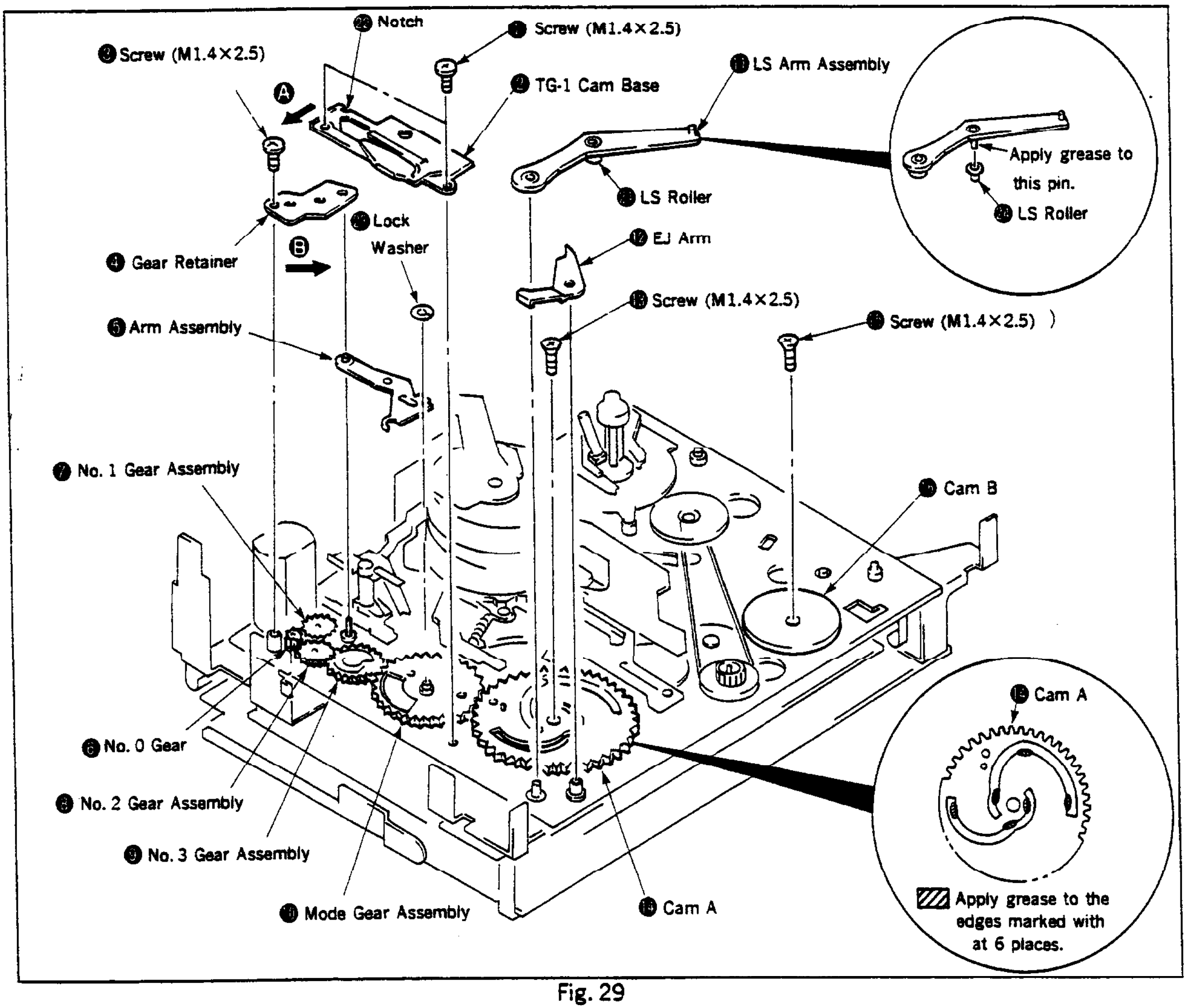

● Notch
● Screw (M1.4×2.5)
● Screw (M1.4×2.5)
❷ TG-1 Cam Base
● LS Arm Assembly
Ⓐ
Apply grease to this pin.
● LS Roller
● LS Roller
● Lock Washer
Ⓑ
❹ Gear Retainer
⓬ EJ Arm
● Screw (M1.4×2.5)
❺ Arm Assembly
● Screw (M1.4×2.5)
❼ No. 1 Gear Assembly
● Cam B
● Cam A
❻ No. 0 Gear
❽ No. 2 Gear Assembly
❾ No. 3 Gear Assembly
● Mode Gear Assembly
● Cam A
▨ Apply grease to the edges marked with at 6 places.

Fig. 29

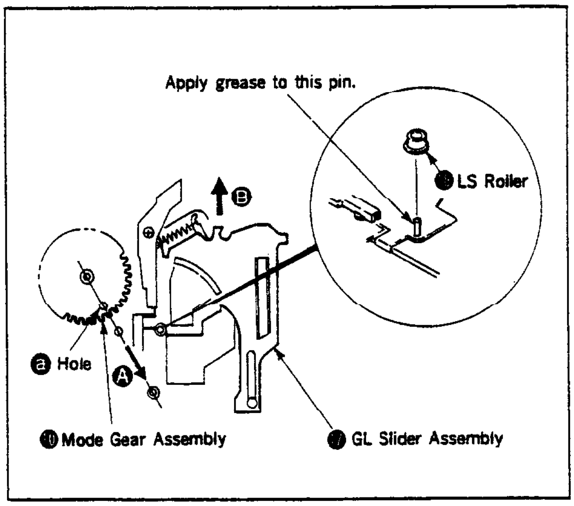

Apply grease to this pin.
⑲ LS Roller
Ⓑ
ⓐ Hole
Ⓐ
⑩ Mode Gear Assembly
⑰ GL Slider Assembly

Fig. 30

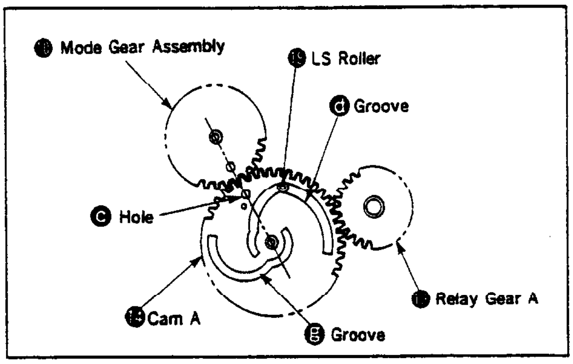

⑩ Mode Gear Assembly
⑲ LS Roller
ⓓ Groove
ⓒ Hole
⑮ Relay Gear A
⑭ Cam A
ⓖ Groove

Fig. 31

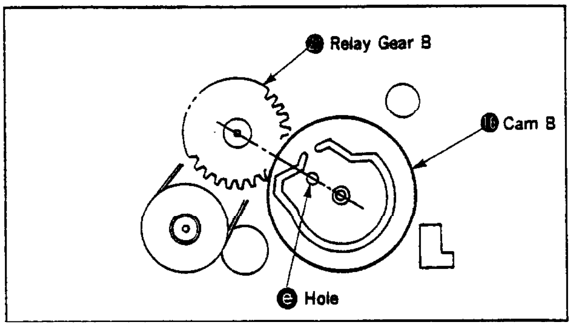

⑳ Relay Gear B
⑯ Cam B
ⓔ Hole

Fig. 32

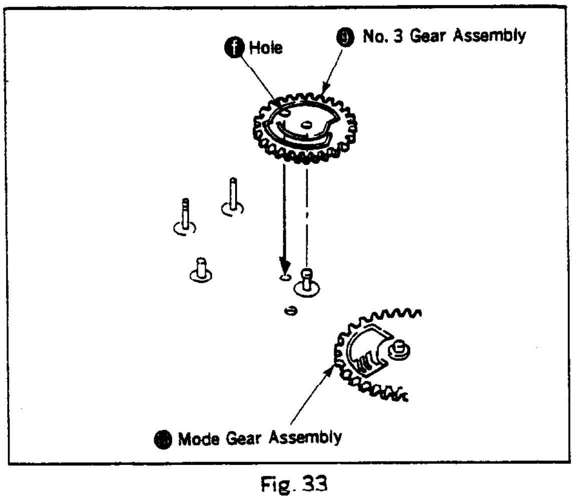

ⓕ Hole
⑨ No. 3 Gear Assembly
⑩ Mode Gear Assembly

Fig. 33

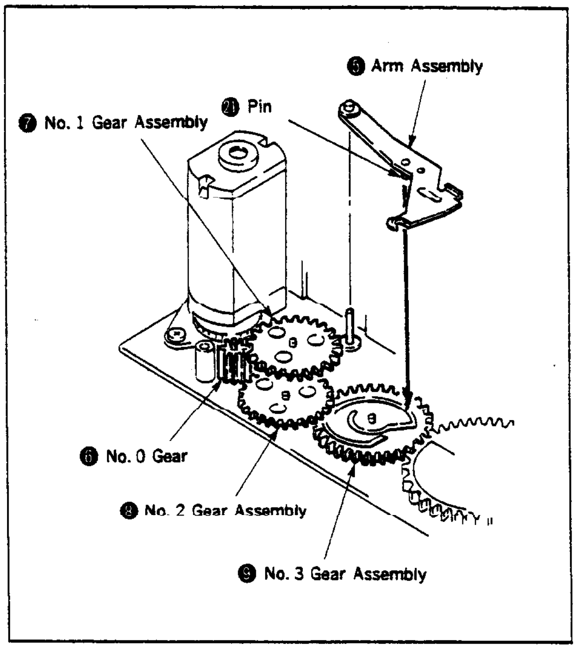

⑤ Arm Assembly
㉑ Pin
⑦ No. 1 Gear Assembly
⑥ No. 0 Gear
⑧ No. 2 Gear Assembly
⑨ No. 3 Gear Assembly

Fig. 34

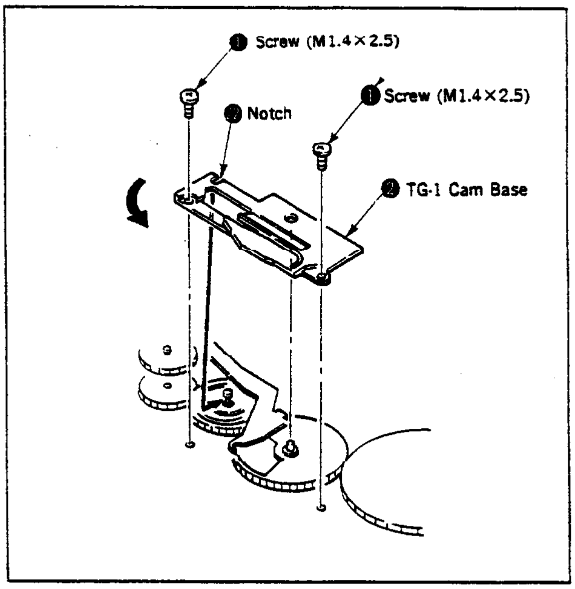

① Screw (M1.4×2.5)
ⓑ Notch
① Screw (M1.4×2.5)
② TG-1 Cam Base

Fig. 35

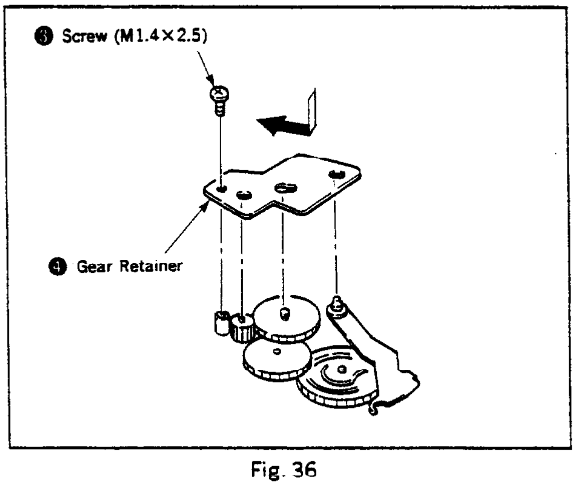

③ Screw (M1.4×2.5)
④ Gear Retainer

Fig. 36

.6 GEAR TRAIN OPERATION CHECK (Fig. 37)

Removal

Referring to 1-1, remove the cassette compartment holder assembly.

Referring to 3-7, remove the LS chassis.

Referring to 3-17, remove the loading motor.

Check

Insert the tip of tweezers into the hole a of the cam A ❶.

Rotate the cam A ❶ by about two thirds of a turn in a direction of the arrow Ⓐ, and then, in a direction of the arrow Ⓑ by the same amount. Repeat this 3 times.

When this is done, check that each, gear, the GL slider assembly and LS arm assembly rotate smoothly, and that no load is applied to them.

4) At the same time, check that the LS roller ❷ is located almost at the end point of the groove of the cam A ❶ when the gear train comes into contact with the stoppers at both ends.

Note : When rotating the cam A ❶ with the tip of tweezers, etc., be careful not to scratch the mechanical chassis.

3. Mounting

1) Referring to 3-17, mount the loading motor.
2) Referring to 3-7, mount the LS chassis assembly.
3) Referring to 1-1, mount the cassette compartment holder assembly.

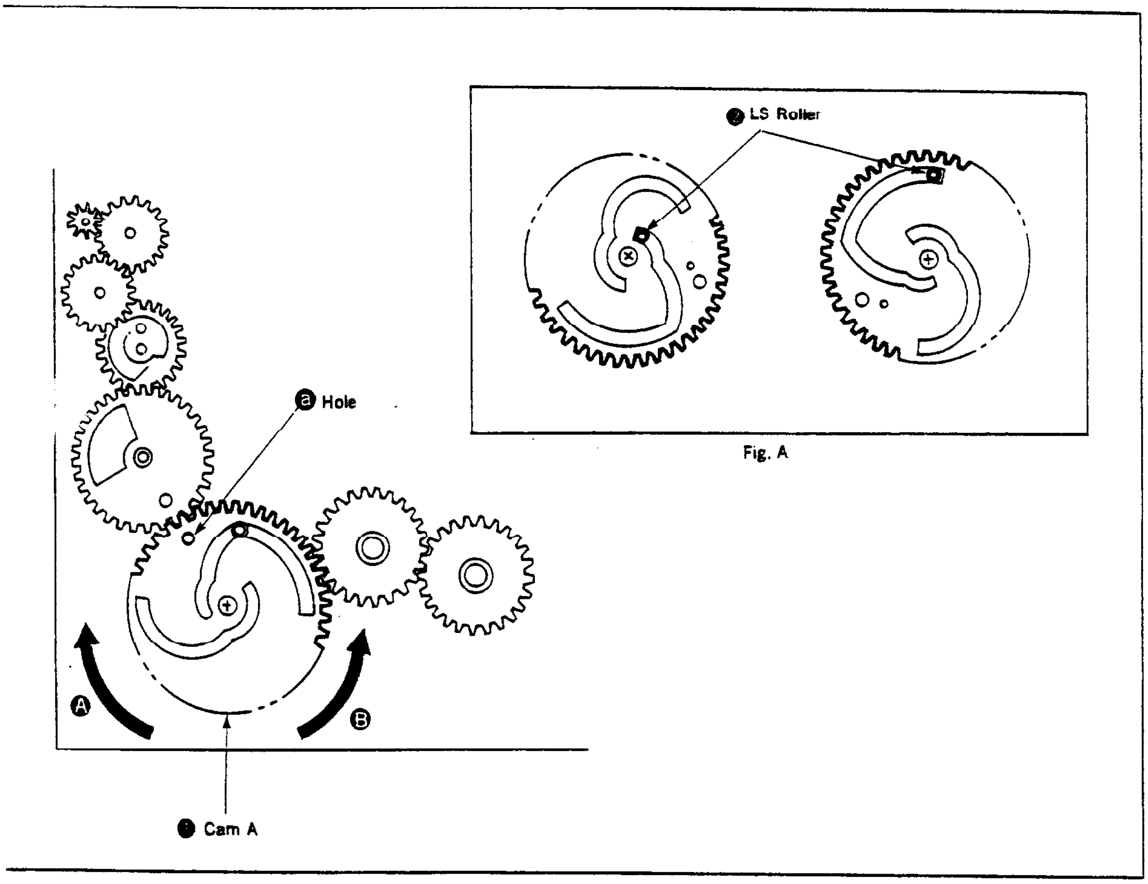


Fig. 37

3-17 LOADING MOTOR ASSEMBLY (Fig. 38)

1. Removal

1) Remove the LB-12 board.
2) Remove the connector ❶.
3) Remove the screws ❷ and ❸, and remove the loading motor assembly ❹ in an arrow direction.

2. Mounting

1) Put the pin ❺ of the loading motor assemmbly ❹ in the hole of the mechanical chassis, and mount it with the screws ❷ and ❸ in that order.
2) Mount the connector ❶.
3) Mount the LB-12 board.

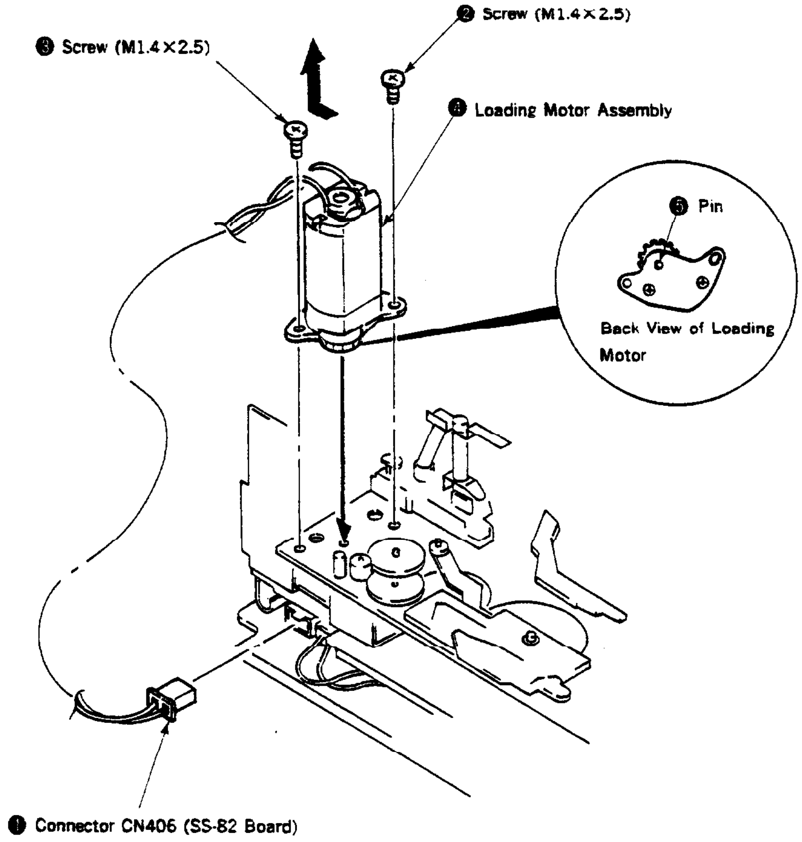

❷ Screw (M1.4×2.5)
❸ Screw (M1.4×2.5)
❹ Loading Motor Assembly
❺ Pin
Back View of Loading Motor
❶ Connector CN406 (SS-82 Board)

Fig. 38

3-18 GUIDE RAIL BASE 1 ASSEMBLY (Fig. 39)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Unskate the LS chassis a little.
3) Remove the two screws ●, and then, guide rail base 1 assembly ●.

Note : Be careful not to lose the spacers inserted in the parts ⓐ and ⓑ of the guide rail base 1 assembly ●. (Fig. B)

2. Mounting

1) Apply half a drip each of molyton grease at 2 places on the back of the guide rail base 1 assembly. (Fig. A)
2) Put the pin ● of the guide rail base 1 assembly ● in the notch of the chassis, and tighten the two screws ● with a torgue of 0.6kg•cm.
3) Referring to 1-1, mount the cassette compartment holder assembly.

Note1 : Mount paying attention to the number of spacers inserted and their locations.

Note2 : When tightening the screws, be careful not to bend the TG-2 upper flange ● with a screwdriver bit.

Note3 : Note that the part c of the guide rail base 1 assembly is easily broken. (Fig. B)

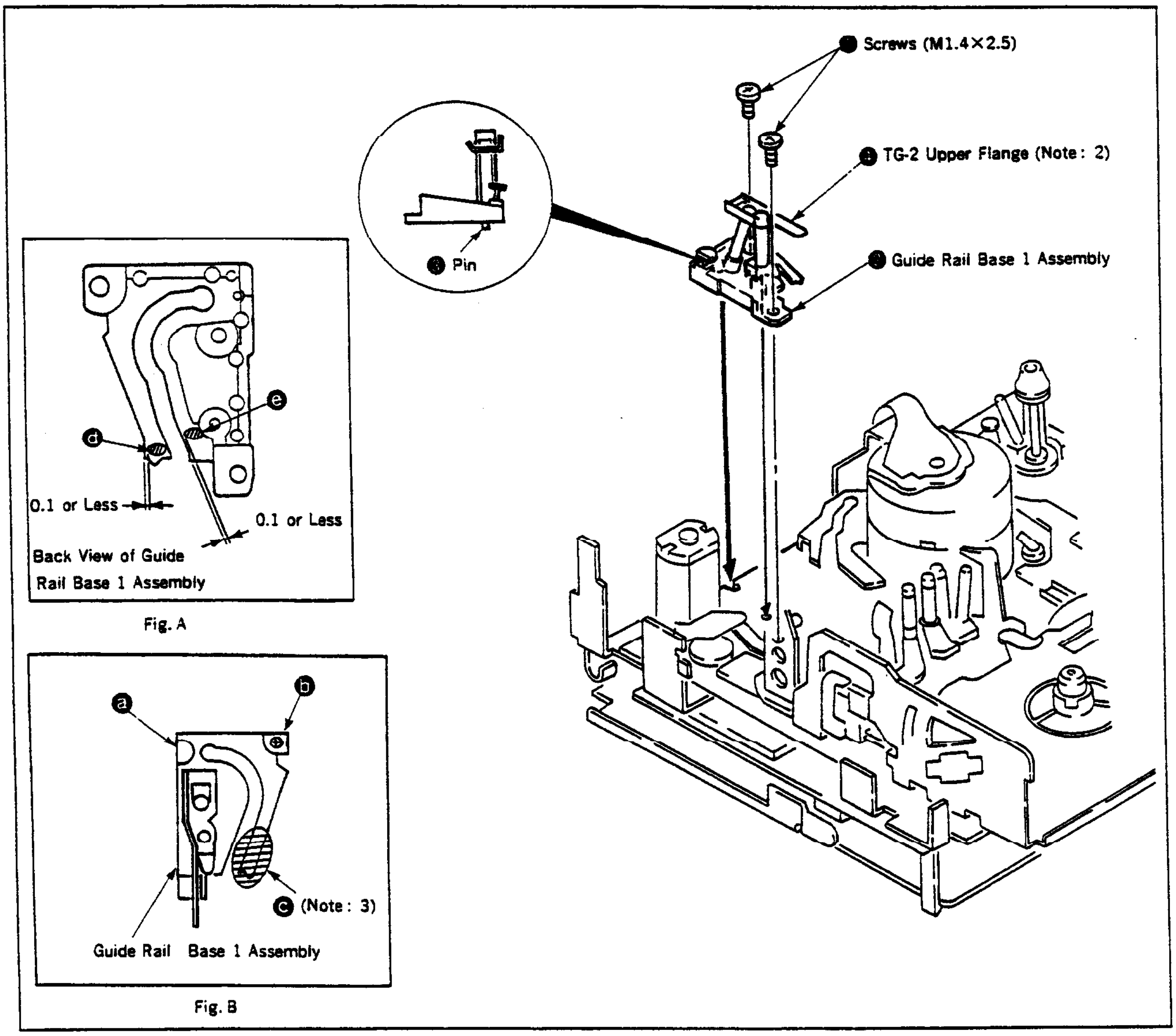

● Screws (M1.4×2.5)
● TG-2 Upper Flange (Note: 2)
● Guide Rail Base 1 Assembly
● Pin
ⓓ
ⓔ
0.1 or Less
0.1 or Less
Back View of Guide Rail Base 1 Assembly
ⓐ
ⓑ
ⓒ (Note: 3)
Guide Rail Base 1 Assembly

Fig. A

Fig. B

図39.

3-19 GUIDE RAIL BASE 2 ASSEMBLY (Fig. 40)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to the Service Manual, open the board in the back of the mechanical chassis.
3) Remove the four screws ●, and then, frame B assembly ● in a direction of the arrowⒶ.
4) Unskate the LS chassis a little.
5) Remove the two screws ●, and then, guide rail base 2 assembly ● in a direction of the arrowⒷ.

Note : Be careful not to hit the drum with a screwdriver bit because the screws are located closed to a drum lead.

2. Mounting

1) Apply half a drip of molyton grease each to 4 places on the back of the guide rail base 2 assembly. (Fig. A)
2) As shown in Fig. B, apply the striking parts of the guide rail base 2 assembly ● to the lower drum, and slide in an arrow direction to fit.
3) Pushing the part ✱ of the guide rail base 2 assembly ● lightly in a direction of ⓔ (Fig. B), tighten the two screws ● with a torque of 0.8kg•cm.

Note : Note that the part f is easily broken.

4) Mount the frame B assembly with the four screws ●.
5) Mount the opened board to the back of mechanical chassis.
6) Referring to 1-1, mount the cassette compartment holder assembly.

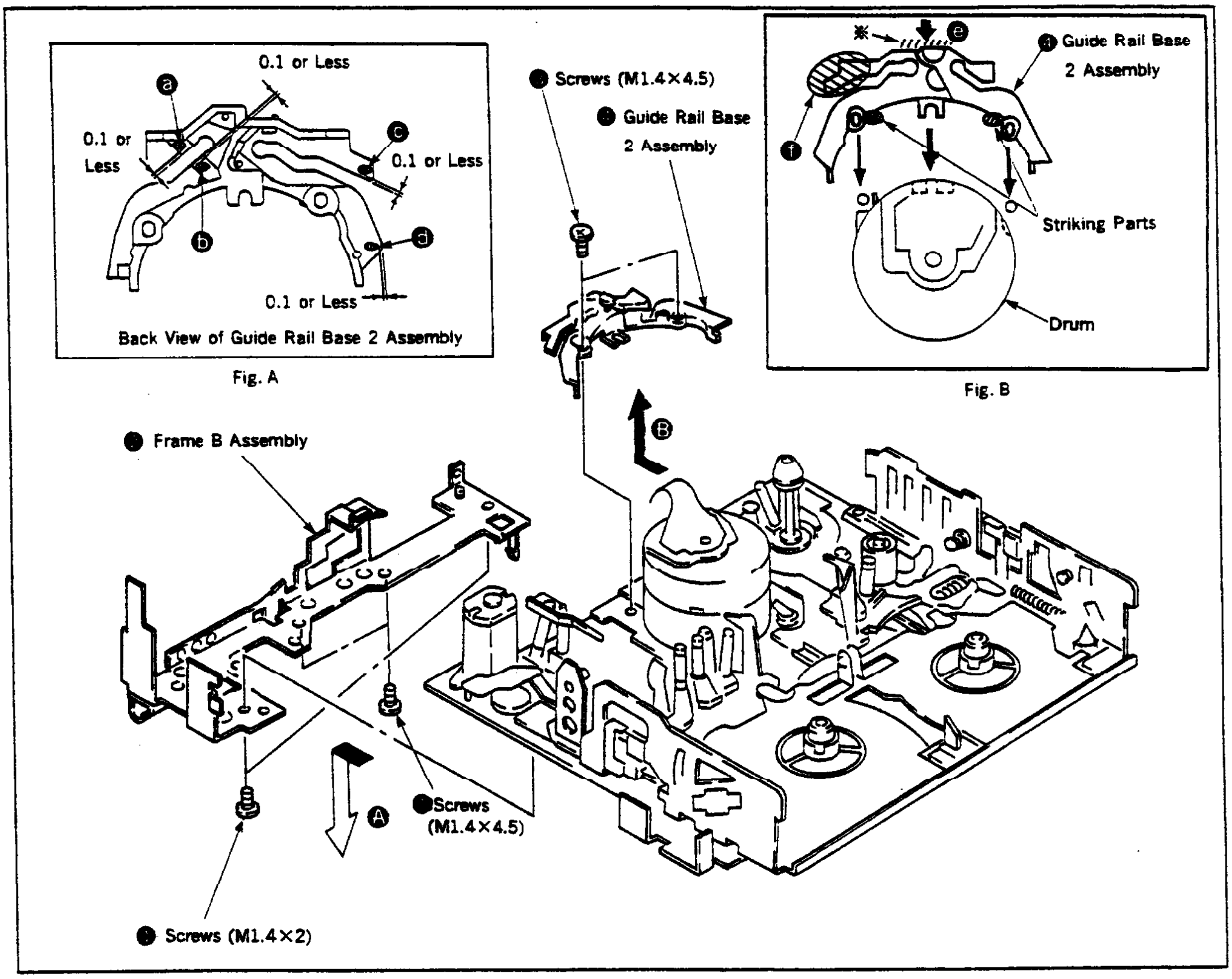

0.1 or Less
ⓐ
0.1 or Less
ⓒ
0.1 or Less
ⓑ
ⓓ
0.1 or Less
Back View of Guide Rail Base 2 Assembly
● Screws (M1.4×4.5)
● Guide Rail Base 2 Assembly
✱
ⓔ
● Guide Rail Base 2 Assembly
ⓕ
Striking Parts
Drum
● Frame B Assembly
Ⓑ
Ⓐ
●Screws (M1.4×4.5)
● Screws (M1.4×2)

Fig. A

Fig. B

Fig. 40

3-20 GUIDE RAIL BASE 3 ASSEMBLY (Fig. 41)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Remove the flexible rotatry shaft ●.
3) Remove the two screws ●. Remove the guide rail base 3 assembly ● in an arrow direction, seeing to it that it does not hitch on the capstan housing.

Note : Handle the ✱ marked part carefully because it is easily broken.

2. Mounting

1) Apply half a drip of molyton grease each to 2 places on the back of the guide rail base 3 assembly ●. (Fig. A)
2) Mount the guide rail base 3 assembly ●, seeing to it that it does not hitch on the capstan housing.
3) Tighten the two screws ● with a torque of 0.6kg•cm.
4) Mount the flexible rotary shaft ●.
5) Referring to 1-1, mount the cassette compartment holder assembly.

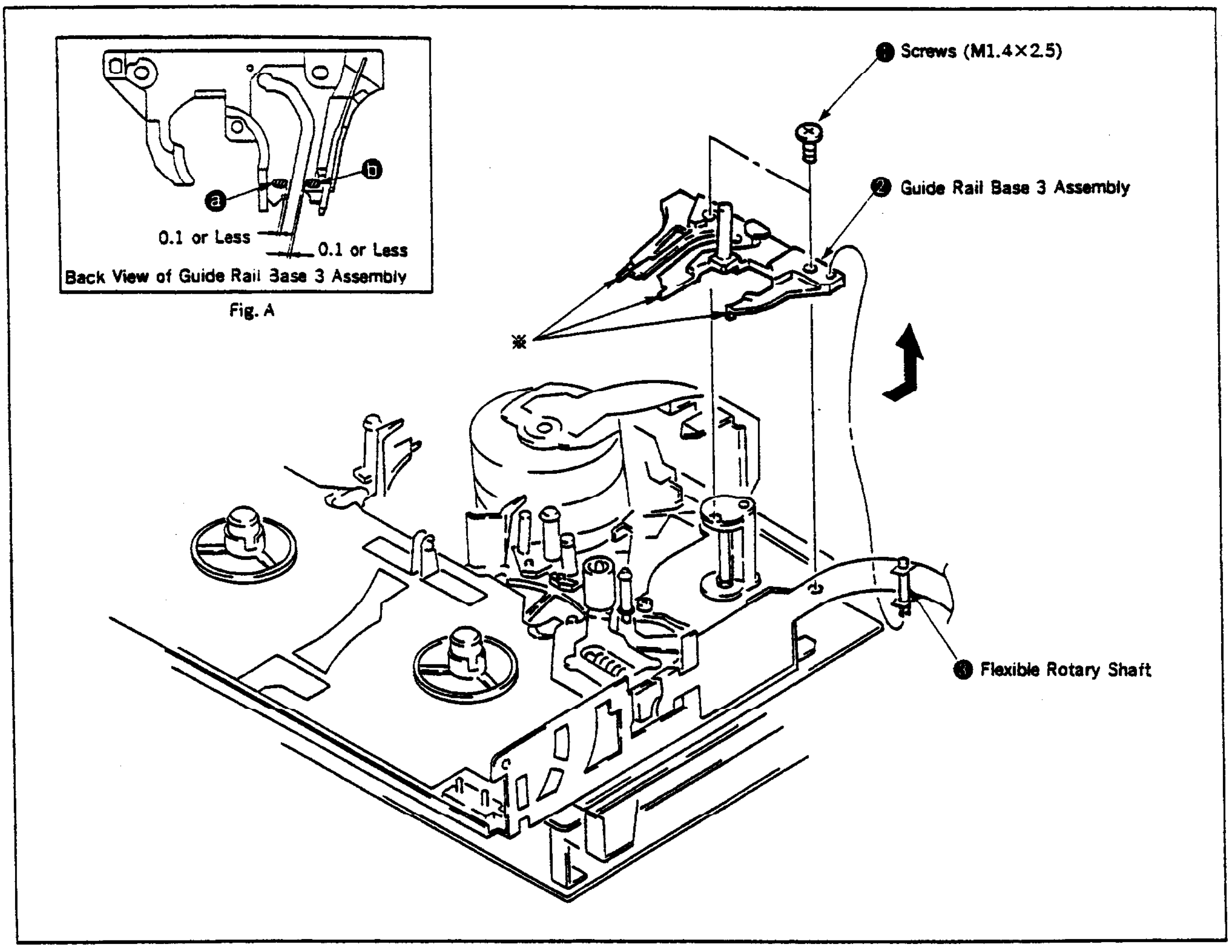

ⓐ
ⓑ
0.1 or Less
0.1 or Less
Back View of Guide Rail Base 3 Assembly
Fig. A
❶ Screws (M1.4×2.5)
❷ Guide Rail Base 3 Assembly
※
❸ Flexible Rotary Shaft

Fig. 41

3-21 CAPSTAN MOTOR ASSEMBLY (Fig. 42)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-20, remove the guide rail base 3 assembly.
3) Remove the connector ❷ of the capstan motor assembly ❶.
4) Remove the screw ❸. Disengaging the gear of the conversion gear assembly ❹, remove the capstan motor assembly ❶ in an arrow direction (obliquely).

2. Mounting

1) As shown in Fig. A, incline the capstan motor assembly ❶ to engage the gear of the capstan motor assembly ❶ with that of the conversion gear assembly ❹, and tighten the screw 3 with a torque of 1kg•cm.
   When this is done, be careful not to damage the gear of the conversion gear assembly ❹.
2) Mount the connector 2 to the capstan motor assembly ❶.
3) Referring to 3-20, mount the guide rail base 3 assembly.
4) Referring to 1-1, mount the cassette compartment holder assembly.

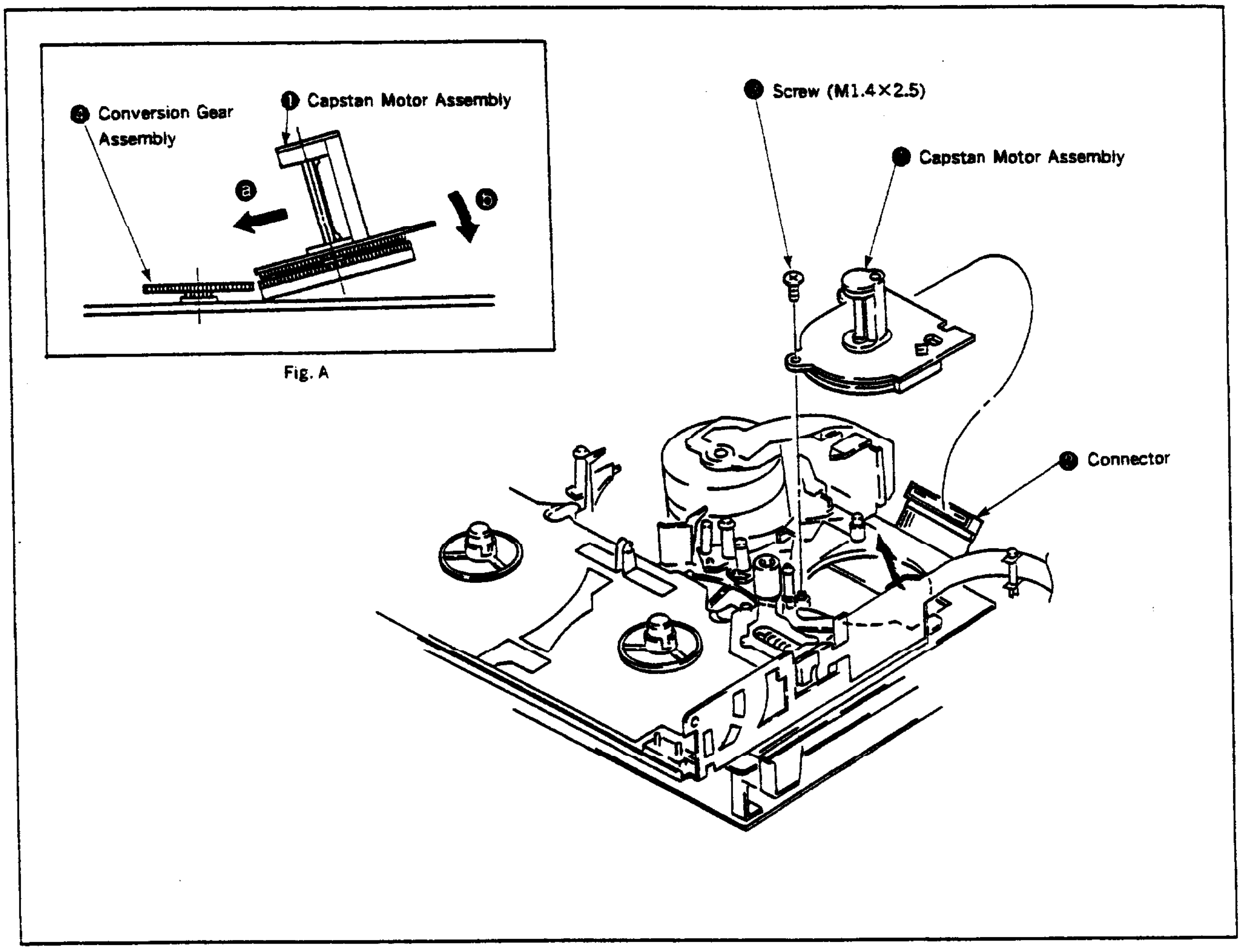

❹ Conversion Gear Assembly
❶ Capstan Motor Assembly
ⓐ
ⓑ
❸ Screw (M1.4×2.5)
❶ Capstan Motor Assembly
❷ Connector

Fig. A

Fig. 42

3-22 DRUM BASE ASSEMBLY (Fig. 42)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Remove the motor flexible board ● from the board.
3) Referring to 3-19, remove the guide rail base 2 assembly.
4) Remove the two screws ●.
5) Draw out the head flexible board ● carefully from the hole of the mechanical chassis not to damage it, and remove the drum base assembly.

2. Mounting

1) Put the head flexible board ● in the hole of the mechanical chassis and put the positioning pins ● of the drum base in the holes of the mechanical chassis.
2) Tighten the two screws ● with a torque of 0.8kg•cm.
3) Referring to 3-19, mount the guide rail base 2 assembly.
4) Mount the motor flexible board ● to the board.
5) Referring to 1-1, mount the cassette compartment holder assembly.

Note : After mounting, make tape path adjustment in Section 4.

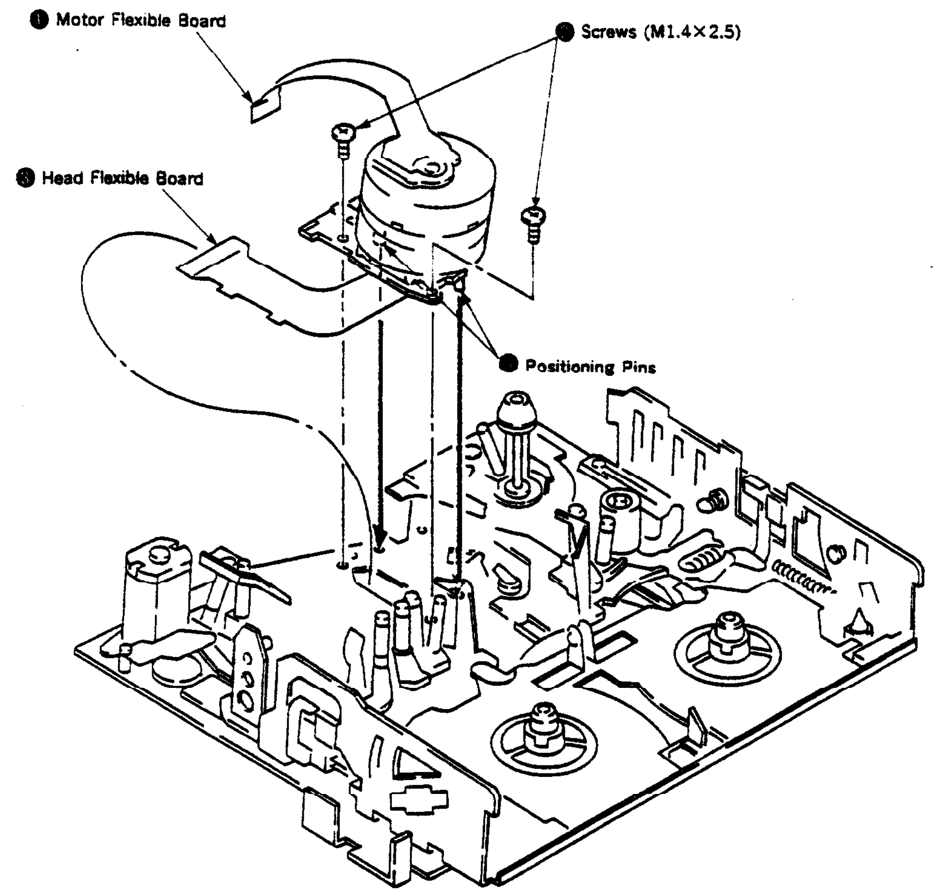


Fig. 42

3-23 DRUM ASSEMBLY (Fig. 43)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Remove the motor flexible board ❶ from the board.
3) Referring to 3-19, remove the guide rail base 2 assembly.
4) Remove the three screws ❷ from the back of the mechanical chassis.
5) Draw out the head flexible board ❸ carefully from the hole of the mechanical chassis not to damage it, and remove the drum assembly ❹.

2. Mounting

1) Put the head flexible board ❸ in the hole of the mechanical chassis, and mount it so that the pins ⓑ and ⓓ will be put in the holes ⓐ and ⓒ shown in Fig. A.
2) Tighten the three screws ❷ with a torque of 0.5kg•cm.
3) Referring to 3-19, mount the guide rail base 2 assembly.
4) Mount the motor flexible board ❶ to the board.
5) Referring to 1-1, mount the cassette compartment holder assembly.

Note : After mounting, make tape path adjustment in Section 4.

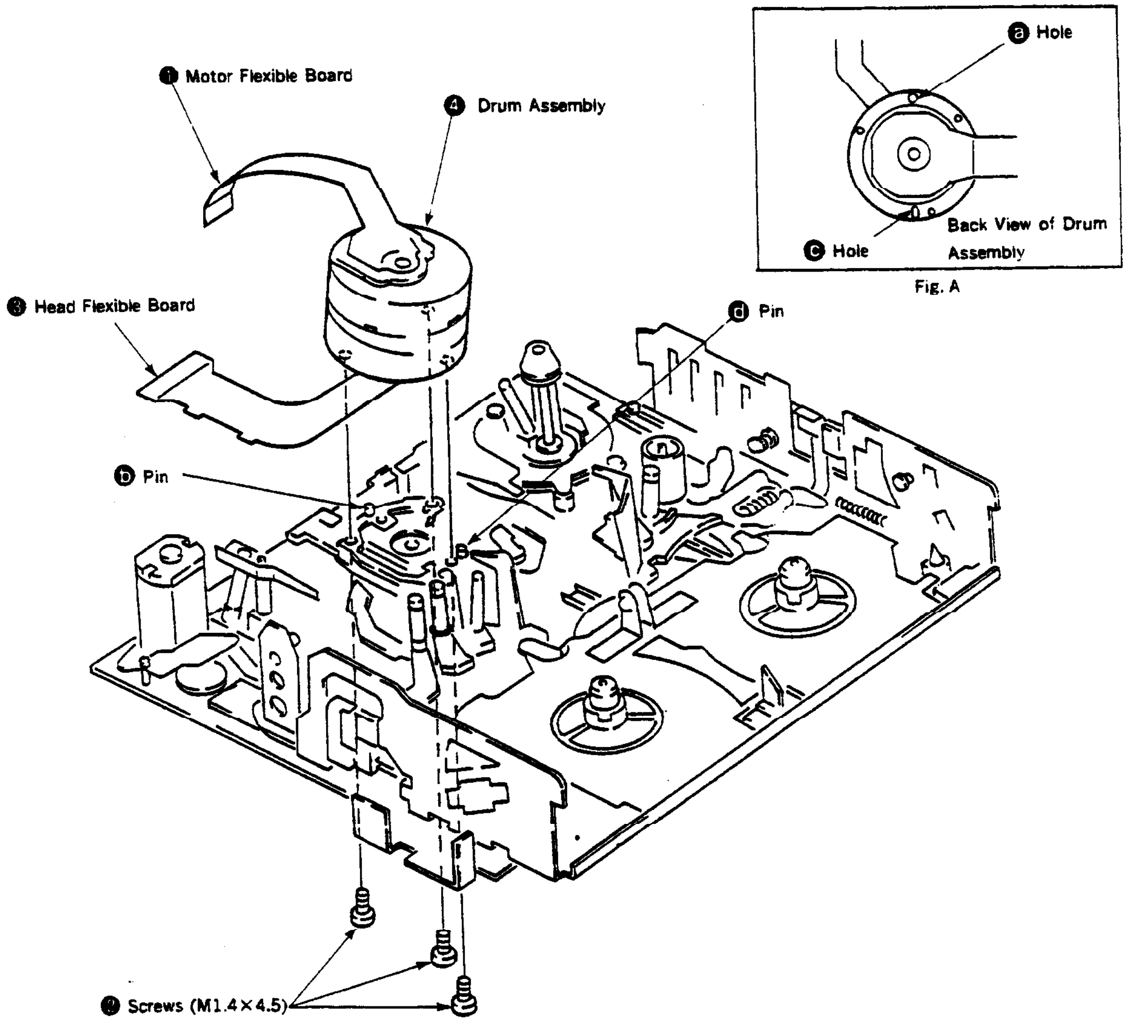
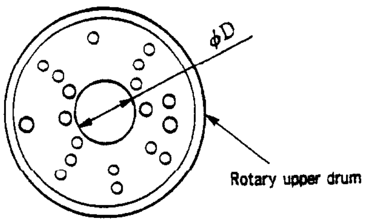

ⓐ Hole
Back View of Drum Assembly
ⓒ Hole
Fig. A
❶ Motor Flexible Board
❹ Drum Assembly
❸ Head Flexible Board
ⓓ Pin
ⓑ Pin
❷ Screws (M1.4×4.5)

Fig. 43

3-24 Replacement of Rotary Upper Drum Assembly

There are two rotary upper drum assembly types, depending on a color mark. (Fig. A in Fig. 45)



NTSC:

A-7049-190-A	Rotary upper drum assembly DGR-32-R-(1)
A-7049-189-A	Rotary upper drum assembly DGR-32-R-(2)

PAL:

A-7049-197-A	Rotary upper drum assembly DGR-37-R-(1)
A-7049-198-A	Rotary upper drum assembly DGR-37-R-(2)

Manufacturing upper dram

RANK	ϕD	MARK	
A	$\phi 8^{+0.0015}_{+0.001}$	Green	—01
B	$\phi 8^{+0.001}_{+0.0005}$	Green, Brown	
C	$\phi 8^{+0.0005}_{0}$	Black	
D	$\phi 8^{0}_{-0.0005}$	Black, Brown	
E	$\phi 8^{-0.0005}_{-0.001}$	Red	—11
F	$\phi 8^{-0.001}_{-0.0015}$	Red, Brown	
G	$\phi 8^{-0.0015}_{-0.002}$	Blue	
H	$\phi 8^{-0.002}_{-0.0025}$	Blue, Brown	

Repairing upper drum

SUFFIX	ϕD	REMARKS	DRUM UPPER
−01	$\phi 8^{+0.001}_{+0.0005}$	Green, Brown	NTSC DGR-32-R-(1) PAL DGR-37-R-(1)
	$\phi 8^{+0.0005}_{0}$	Black	
−11	$\phi 8^{-0.001}_{-0.0015}$	Red, Brown	NTSC DGR-32-R-(2) PAL DGR-37-R-(2)
	$\phi 8^{-0.0015}_{-0.002}$	Blue	

1. Removal

1) Referring to 3-23, remove the drum assembly.
2) Remove the two screws ●. (Fig. 44)
3) Hold the outlet (base) of the guide protector ●, lift it up obliquely. In that state, hold the outer figure of the back yoke ● and remove it. (Fig. 44)

Note: Note that the flexible board and guide protector ● easily come off position because they are only pasted.

4) As shown in Fig. A, set the rotor earth spring ● around spring hook. (Fig. 44)
5) Using a drum screwdriver (Ref. No. J-11), remove the two hexagon socket bolts ●, and then, rotary upper drum assembly ●. (Fig. 45)
6) Using the drum screwdriver (Ref. No. J-11), remove the two hexagon socket bolts ●, and then, rotor ●. (Fig. A in Fig. 45)

2. Mounting

1) Clean the flange surface● and the surface of the rotary upper drum assembly ● which comes into contact with it, and make sure that there is no dust or scratch. (Fig. 45)
2) Adjust a direction of the upper drum so that the head contact mold pin● will be put in the reference hole of the rotary upper drum assembly ●, and push it in lightly. (Fig. 45)

Note: Check visually that the clearance between the upper and lower drums is about 0.05mm.

3) Using the drum screwdriver (Ref. No. J-11), tighten the two hexagon socket bolts ● (800g•cm) and rotate it with finger to make sure that there is no abnormality. (Fig. 45)
4) Put the pin ● of the rotor ● in the hole of the rotary upper drum assembly. Using the drum screwdriver (Ref. No. J-11), tighten the hexagon socket bolts ●. (800g•cm) (Fig. A in Fig. 45)
5) Remove the rotor earth spring ● from the spring hook. Using tweezers, etc., hook it onto the groove of the stator boss●. (Fig. B in Fig. 45)

Note: See to it that the rotor earth spring ● is not located in the gap between the flange and stator.

6) Hold the outer figure of the back yoke ●, put it on the inner step of the upper drum and insert the other side slowly. (Fig. B in Fig. 44)
7) Tighten the two screws ●. (500g•cm) (Fig. 44)
8) Rotate the upper drum with finger to check that it runs smoothly.
9) Referring to 3-23, mount the drum assembly.

Note: After mounting, be sure to make tape path adjustment in Section 4.

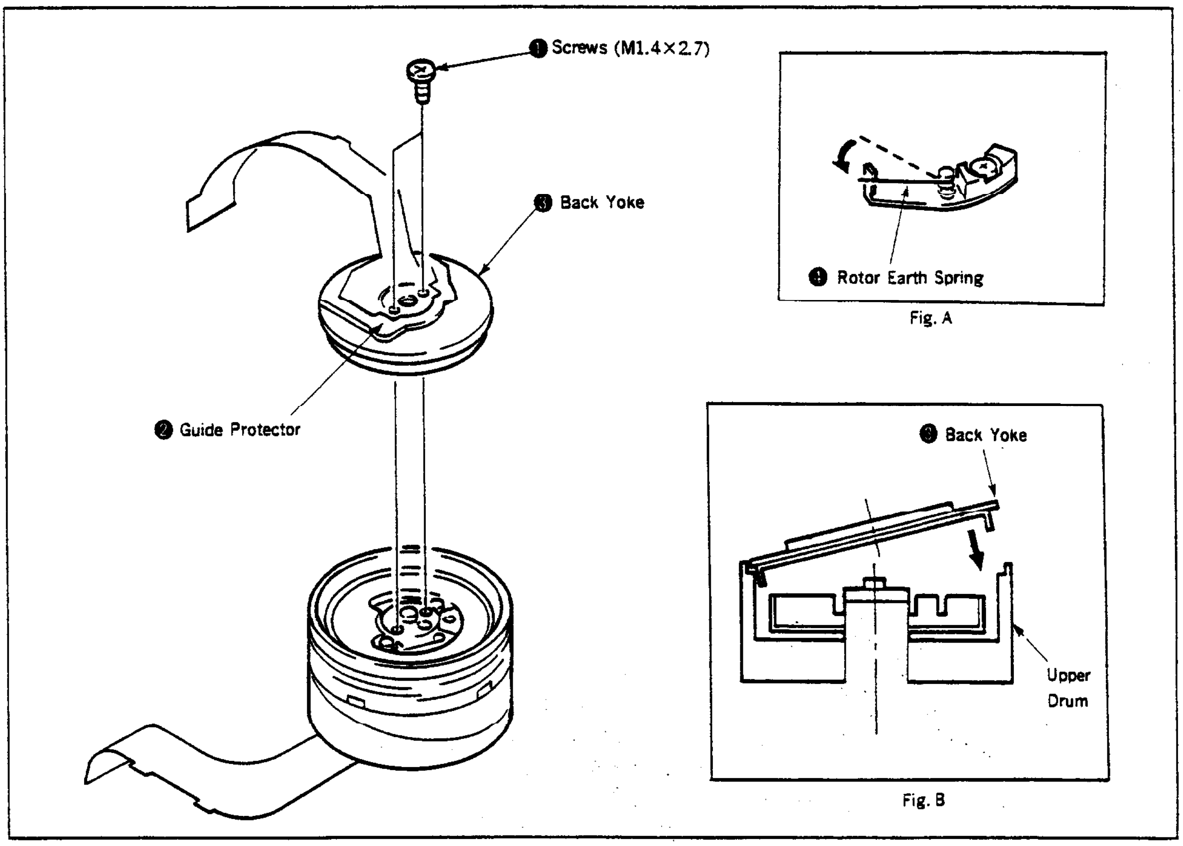

❶ Screws (M1.4×2.7)
❸ Back Yoke
❷ Guide Protector
❹ Rotor Earth Spring
❸ Back Yoke
Upper Drum

Fig. A

Fig. B

Fig. 44

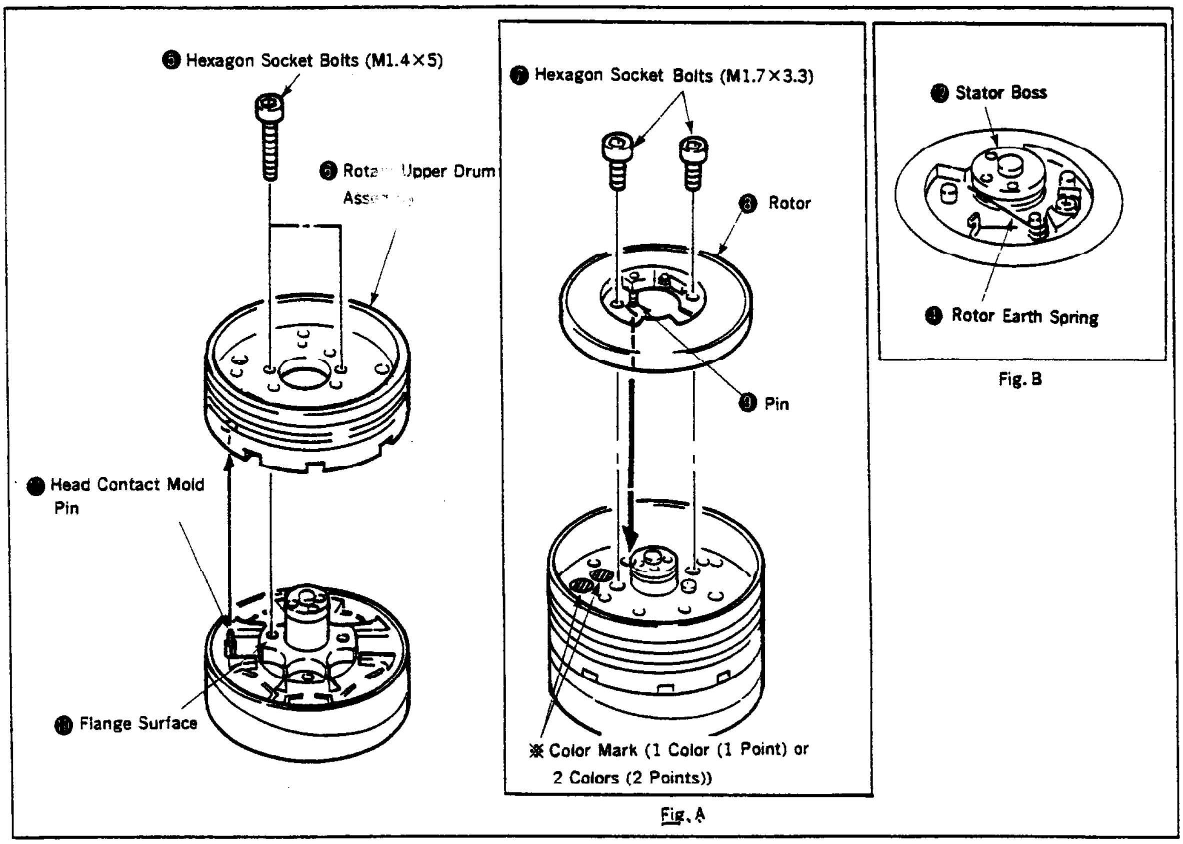

❺ Hexagon Socket Bolts (M1.4×5)
❻ Rotary Upper Drum Assembly
⓫ Head Contact Mold Pin
❿ Flange Surface
❼ Hexagon Socket Bolts (M1.7×3.3)
❽ Rotor
❾ Pin
※ Color Mark (1 Color (1 Point) or 2 Colors (2 Points))
⓬ Stator Boss
❹ Rotor Earth Spring

Fig. A

Fig. B

Fig. 45

5 REEL TABLE HEIGHT CHECK (Fig. 46)

Removal

Referring to 1-1, remove the cassette compartment holder assembly.

Referring to 3-1, remove the LED base.

Check

Using slide calipers, etc., check that distances from the LS chassis to the S reel table reel resting surface ❷ and T reel table reel resting surface ❸ are ~~3.2±0.5mm~~ respectively.

3. Mounting

1) Referring to 3-1, mount the LED base.
2) Referring to 1-1, mount the cassette compartment holder assembly.

changed values

A:$3.2^{+0.2}_{-0.15}$mm
B:3.2±0.15mm

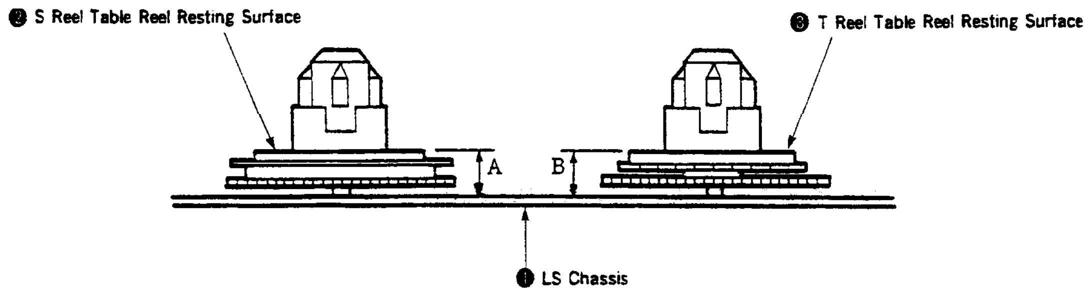

❷ S Reel Table Reel Resting Surface
❸ T Reel Table Reel Resting Surface
A
B
❶ LS Chassis

Fig. 46

6 FWD/RVS TORQUE CHECK

Set the FWD/RVS take-up torque cassette (Ref. No. J-10).

In the FWD mode, check that a T reel torque value is ~~6g·cm — 16g·cm~~ **changed value** 5 – 15g·cm.

Turn on the REC/REVIEW button and check that an S reel torque value is 25g·cm – 45g·cm.

When the values above are not met, replace the respective reel tables.

3-27 TENSION REGULATOR POSITION ADJUSTMENT

1. Removal

1) Referring to 1-1, remove the cassette compartment holder.

2. Adjustment

1) Set a cassette tape, select the REC mode and run the tape. (Refer to 1-3)
2) With the tape running, check that the distance between TG-1 and TG-2 is ~~0.58±0.2mm.~~ (Fig. 47)
3) When they are not at specified positions, remove the cassette and go through the steps 4) on.
4) Referring to 3-1, remove the LED base.
5) Loosen the screw ❶.

changed value

9.35 – 10.7mm.

6) When TG-1 is located inside (or outside) its specified position, shift the TG-1 adjustment block 2 slightly in a direction of the arrow Ⓐ (or Ⓑ) and fix with the screw ❶. (Fig. 48)
7) Referring to 3-1, mount the LED base.

Note : Use the cassette tape after feeding the tape as far as a middle point.

Note : When taking the steps 4) and 5), remove the cassette tape first.

Note : Check that TG1 is able to move in direction C during REC.

3. Mounting

1) Referring to 1-1, mount the cassette compartment holder assembly.

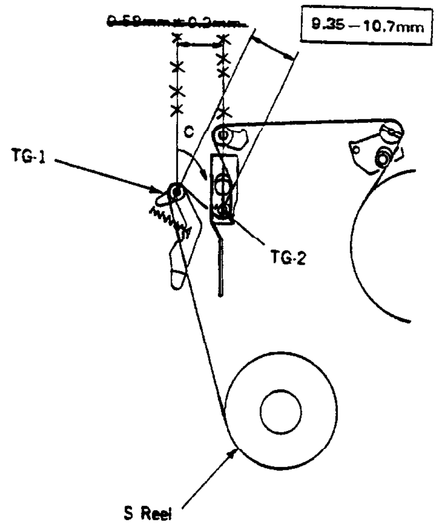


Fig. 47

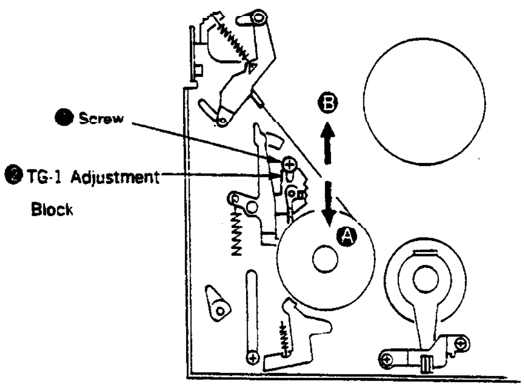


Fig. 48

3-28 FWD BACK TENSION ADJUSTMENT (Fig. 49)

1. Removal

1) Referring to 1-1, remove the cassette compartment assembly.
2) Referring to 3-7, remove the LED base.

2. Adjustment

1) Select the REC mode.
2) Set the tension measurement reel (Ref. No. J-8)❶.
3) Using the dial tension gauge (Ref. No. J-7)❷, measure a tape tension at the outlet of TG-2. When this is done, pull the tape at a rate of 14mm/sec.
4) Change the position of the tention regulator spring ❸ position as shown in Fig. A so that measure center value of the tention is 4 g-6.5g.

Note : When this is done, see to it that the gear ❹ is not engaged with the S reel table.

3. Mounting

1) Referring to 1-1, mount the cassette compartment holder assembly.
2) Referring to 3-1, mount the LED base.

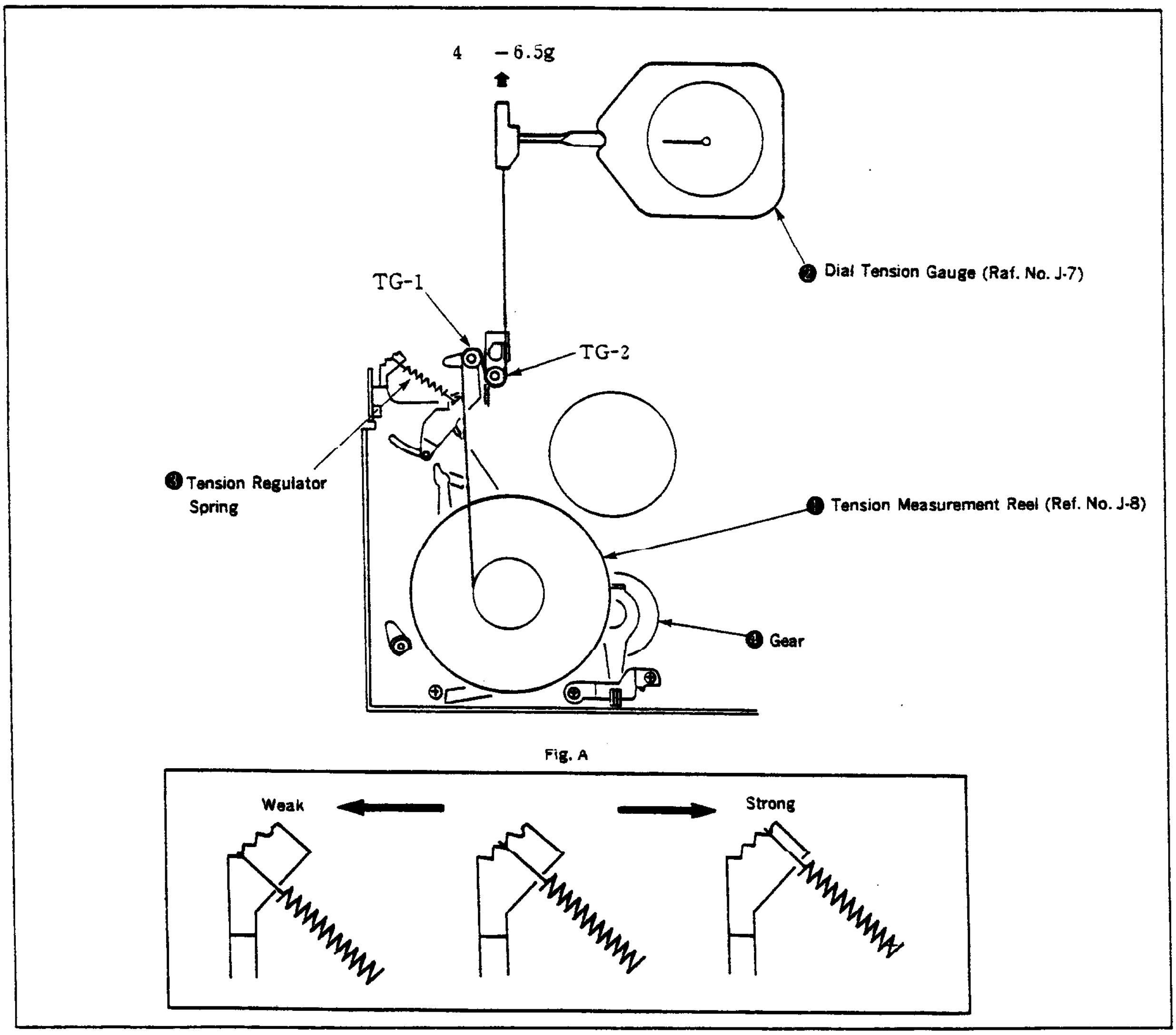

4 -6.5g
❷ Dial Tension Gauge (Raf. No. J-7)
TG-1
TG-2
❸ Tension Regulator Spring
❶ Tension Measurement Reel (Ref. No. J-8)
❹ Gear
Fig. A
Weak
Strong

Fig. 49

4. TAPE PATH ADJUSTMENT

The 8mm video system uses ATF (Automatic Track Finding) which instantaneously controls a tape running speed based on 4 types of pilot signals and performs high-precision tracking.

This does away a tracking control knob and allows accurate track tracing.

On the other hand, however, the ATF system has a problem in adjusting the tape path system. That is, if head tracing is out of order a little, the ATF system automatically corrects it, which means that perfect adjustment cannot be done.

To avoid this problem, a track shift jig had been used to adjust the tape path system. In the FL (Q) mechanism, the ATF system is forcibly operated to shift a tracking amount constantly (approx. 1/4) by setting the PATH mode. So, fine tracking adjustment can be easily done.

No track shift jig is required any more.

Example) For CCD-V11/V88

CN404

4	GND
3	$\overline{\text{CAM ADJ}}$
2	$\overline{\text{TEST}}$
1	$\overline{\text{PATH}}$

The path mode is set by shorting the pins ① and ④.

4-1 PREPARATION FOR ADJUSTMENT

1) Clean the tape running surfaces (tape guides, drum, capstan shaft, pinch roller). (Fig. 51)
2) Set the PATH mode by shorting the TEST pins (CN404 pins ① and ④ for CCD-V11/V88).
3) Connect to an oscilloscope.
4) Play back a tracking alignment tape (NTSC: WR5-1N), (PAL: WR5-1C).
5) Check that a RF waveform is flat at the inlet and outlet of the oscilloscope. (Fig. 50 ⓐ)
When it is not flat, make adjustment in accordance with the procedures below.
When the RF waveform is not flat at the inlet/outlet; (Fig.50 ⓑ and ⓒ)

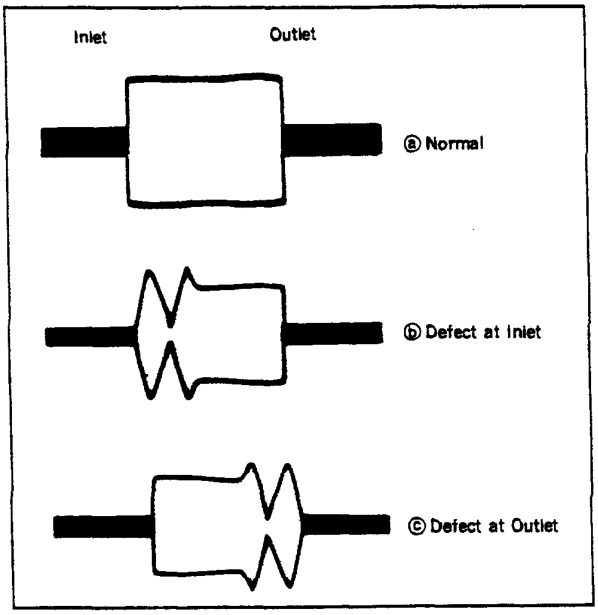

Inlet
Outlet
ⓐ Normal
ⓑ Defect at Inlet
ⓒ Defect at Outlet

Fig. 50

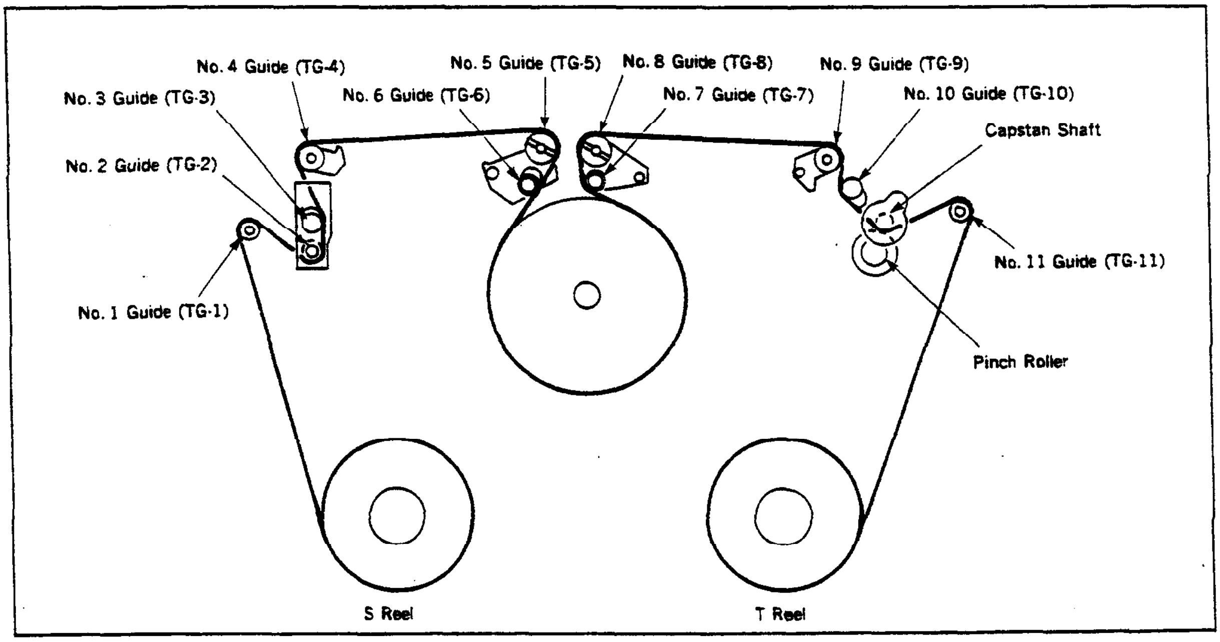

No. 4 Guide (TG-4)
No. 5 Guide (TG-5)
No. 8 Guide (TG-8)
No. 9 Guide (TG-9)
No. 3 Guide (TG-3)
No. 6 Guide (TG-6)
No. 7 Guide (TG-7)
No. 10 Guide (TG-10)
Capstan Shaft
No. 2 Guide (TG-2)
No. 11 Guide (TG-11)
No. 1 Guide (TG-1)
Pinch Roller
S Reel
T Reel

Fig. 51 Tape Guides Location

4-2 TRACKING ADJUSTMENT (Fig. 52)

1) Play back the tracking alignment tape.
2) Loosen the No. 5 guide (TG-5) lock screw ● and turn the No. 5 guide to flatten the waveform at the inlet.
3) Tighten the No. 5 guide (TG-5) lock screw ● to lock the No. 5 guide.
4) Loosen the No. 8 guide (TG-8) lock screw ● and turn the No. 8 guide to flatten the waveform at the outlet.
5) Tighten the No. 8 guide (TG-8) lock screw ● to lock the No. 8 guide. When this is done, make sure that the waveform does not change at the outlet.

Note : Be careful not to loosen the lock screw too much because the guide is easily moved.

Tape path Adjustment for "Guide Rail Base 2 with TG8 Gate Adjustment"

You do not have to adjust theTG-8 gate adjustment screw.

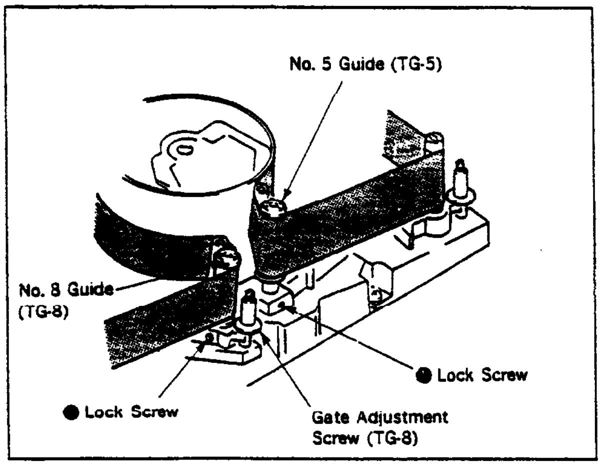


Fig. 52

4-3 NO. 4 GUIDE (TG-4) ADJUSTMENT

When an entire guide base is replaced, its height has been preste.

TG-4 Guide Height Presetting

1) With the top surface of the TG-4 guide leveled, rotate an upper flange by one turn. This is a preset height.

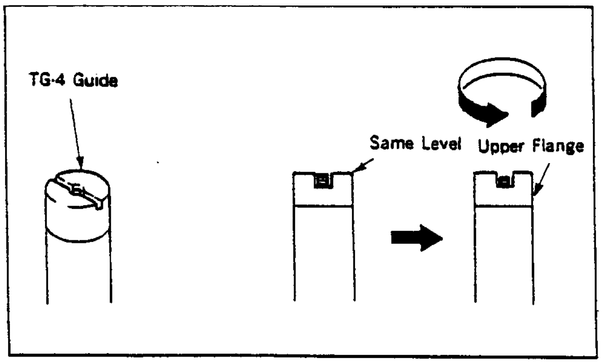


Fig. 53

No. 4 Guide (TG-4) Adjustment

1) Play back the tracking alignment tape.
2) In the FWD mode, check that the tape runs along a TG-4 lower flange. When there is a clearance, turn TG-4 counter-clockwise to put the tape along the TG-4 lower flange. turning angle must be within 180°.
When this is done, check that a tracking waveform (Fig. 54) is not changed.
When a tracking waveform inlet is downward as shown in Fig. 55, make tracking adjustment at the inlet side by raising a height of TG-4.

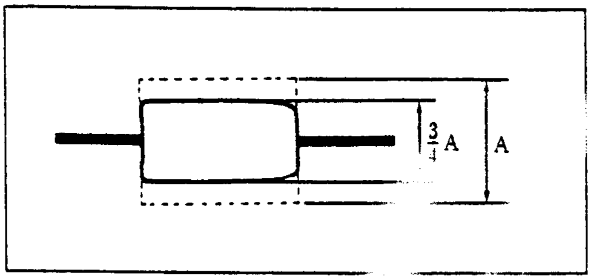


Fig. 54

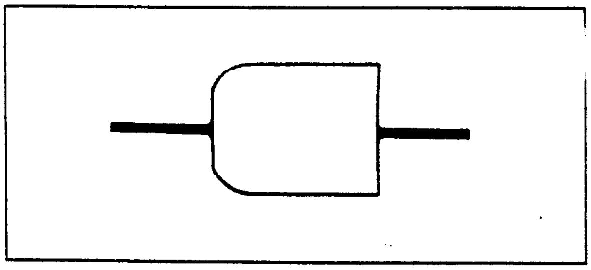


Fig. 55

Tape Path Adjustment for "Guide Rail Base 1 with TG4 Gate Adjustment" (Fig. 56)

After adjusting an inlet, when the TG-4 lower flange is curled in the REV mode, turn the TG-4 gate adjusting screw at pitches of 45° to the left to remove a curl. (A lock screw is attached to the TG-4 gate adjusting screw. First, loosen the lock screw a little, and then, turn the gate adjusting screw. After adjustment, tighten the lock screw.)

If the TG-4 gate adjusting screw is turned to the left too much, the TG-2 upper flange (arrow-indicated part in the figure above) is greatly curled. If it happens, turn the screw to the right.

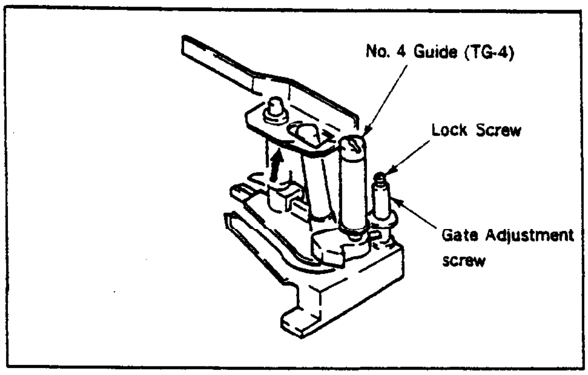


Fig. 56

4-4 NO. 11 GUIDE (TG-11) ADJUSTMENT

1) In the PLAY BACK mode, check that it has no deflection between the capstan and No. 11 guide (TG-11).
   (Criterion: 0.5mm or less)
   when the tape is deflected, turn the No. 11 guide (TG-11) to remove its deflection. (Fig. 57)
2) Select the REV mode and check the RF waveform at the outlet side. (Fig. 58)
3) If the waveform is defective, turn the TG-11 nut counterclockwise by 90° and recheck 2), 3) and 4).
4) Apply screw lock to the No. 11 guide (TG-11).

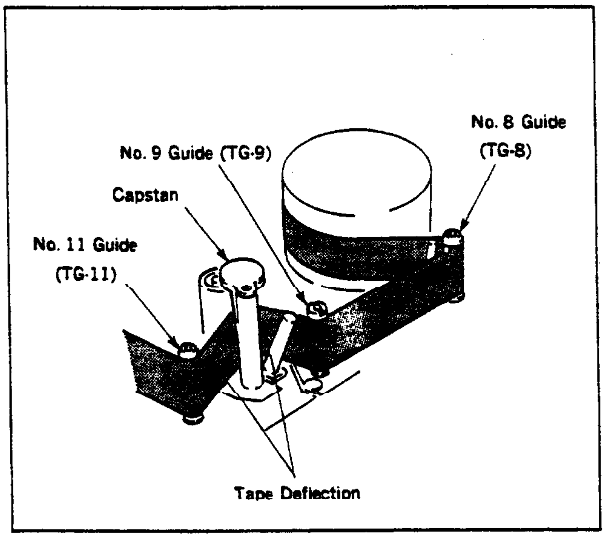

No. 8 Guide
(TG-8)
No. 9 Guide (TG-9)
Capstan
No. 11 Guide
(TG-11)
Tape Deflection

Fig. 57

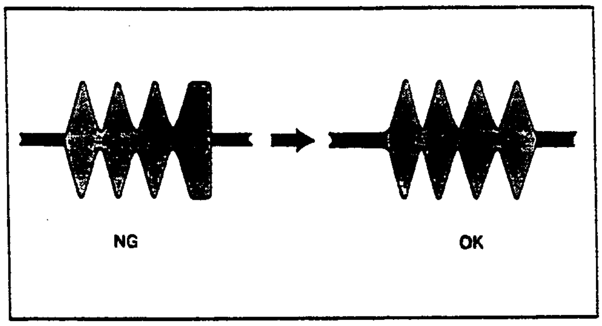


Fig. 58

4-5 CHECK AFTER ADJUSTMENT

1. Tracking Check

1) Play back the tracking alignment tape. In the PATH mode, shift a track. (Fig. 59)
2) At this time, check that a minimum amplitude value (E_{MIN}) is 67% or more of a maximum amplitude value (E_{MAX}). (Fig. 60)
3) Make sure that the waveform does not fluctuate greatly. (Fig. 61)

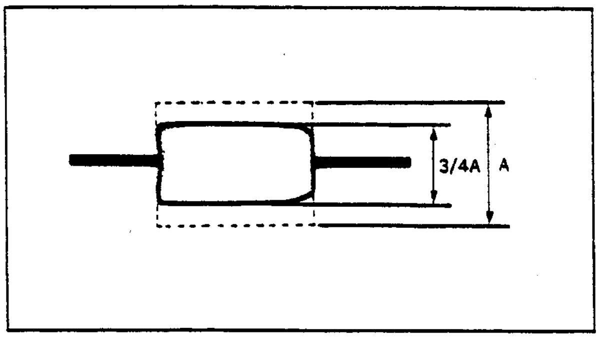


Fig. 59

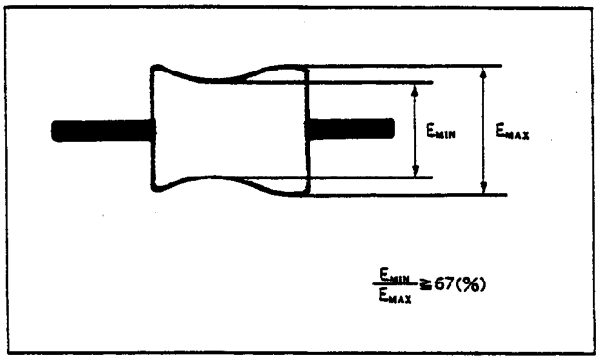


Fig. 60

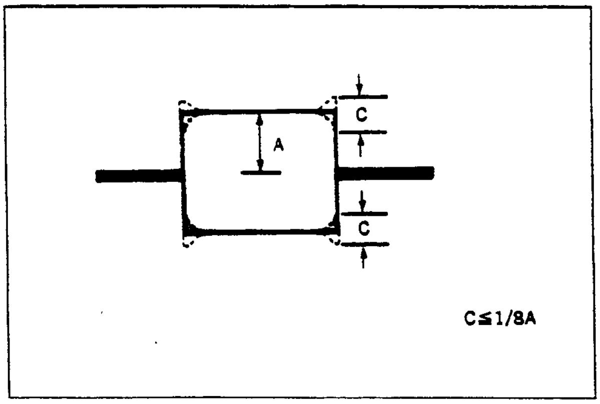


Fig. 61

2. CUE, REV Check

1) Play back the tracking alignment tape and select the REV mode. At this time, waveform peak pitches must be uform. (Fig. 62 ⓐ) When they not uniform, make tracking adjustment in 4-2 and No. 11 guide (TG-11) adjustment in 4-4.
2) Select the CUE mode. At this time waveform peak pitches must be uniform. (Fig. 62 ⓑ) When not uniform, make tracking adjustment in 4-2.

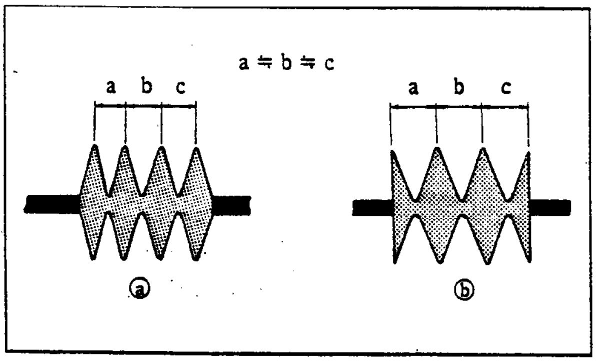


Fig. 62

3. Rise Check

1) Play back the tracking alignment tape.
2) In the PLAY BACK mode, check that the RF waveform rises horizontally within one second. At this time, check also that the tape is not deflected around the pinch roller. (Fig. 63)
3) Play back the tape after CUE/REV and FF/REW operation and check that the RF waveform rises horizontally within one second. At thistime, check also that the tape is not deflected around the pinch roller.
4) Repeat the checks in 2) and 3).

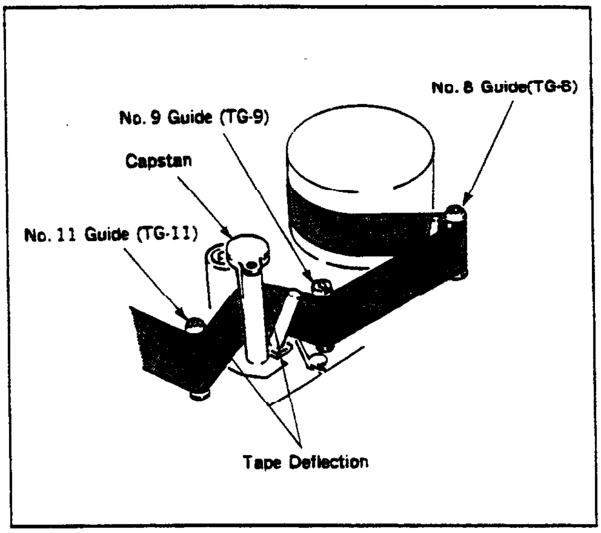

No. 8 Guide(TG-8)
No. 9 Guide (TG-9)
Capstan
No. 11 Guide (TG-11)
Tape Deflection

Fig. 63

4. Tape Running Check

In the CUE and REV modes, check that the TG-2 upper and lower flanges, TG-4 lower flange, TG-5 upper flange, TG-8 upper flange and TG-11 upper and lower flanges are not culed greatly. (Fig. 63)

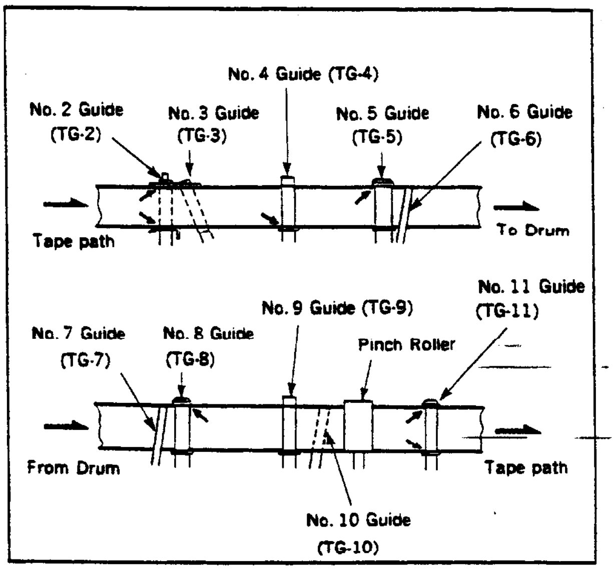
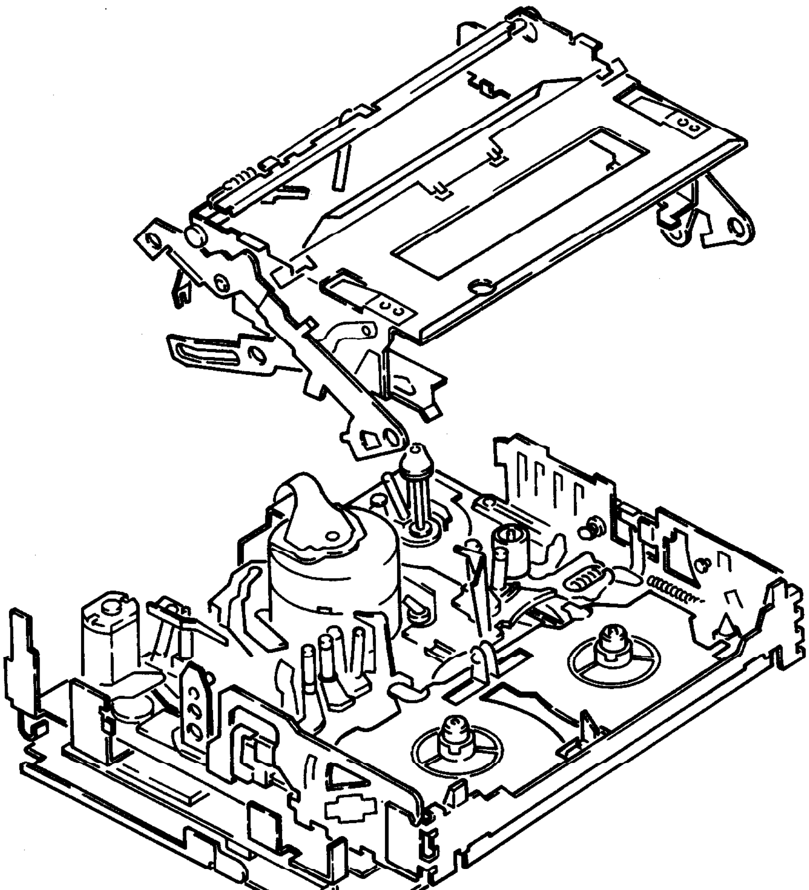

No. 4 Guide (TG-4)
No. 2 Guide (TG-2)
No. 3 Guide (TG-3)
No. 5 Guide (TG-5)
No. 6 Guide (TG-6)
Tape path
To Drum
No. 11 Guide (TG-11)
No. 9 Guide (TG-9)
No. 7 Guide (TG-7)
No. 8 Guide (TG-8)
Pinch Roller
From Drum
Tape path
No. 10 Guide (TG-10)

Fig. 64

8mm Video MECHANICAL ADJUSTMENT MANUAL II

FL MECHANISM (Q MECHANISM) Video 8

File with the SERVICE MANUAL



8 VIDEO RECORDER

SONY®

TABLE OF CONTENTS

1. **PREPARATION FOR MECHANICAL CHECK, ADJUSTMENT AND REPLACEMENT** 3
1-1. Cassette Compartment Holder Assembly 3
1-2. Cassette Compartment Look Height Adjustment .. 4
1-3. Operation with Cassette Compartment Holder Assembly Removed 5
1-4. Handing of Mode Selector 6
1-5. Mode Selector Schematic Diagram 7
1-6. Mode Selector Parts List 7

2. PERIODIC CHECK AND MAINTENANCE

2-1. Cleaning of Rotary Drum 8
2-2. Cleaning of Tape Path 8
2-3. Periodic Check Items 9
2-4. Service Jigs List 10

3. MECHANICAL CHECK,ADJUSTMENT AND REPLACEMENT

3-1. LED Base 11
3-2. RL Base Assembly, Retainer 12
3-3. S Reel Table Assembly 13
3-4. T Reel Table Assembly 14
3-5. Oneway Clutch Assembly 15
3-6. S Soft Arm Assembly 16
3-7. LS Chassis Assembly 17
3-8. Pinch Arm Assembly 19
3-9. TG-11 Arm Assembly 20
3-10. TG-1 Arm Assembly 21
3-11. String Joint 22
3-12. Guide Arm T Assembly, Guide Arm S Assembly .. 23
3-13. Pinch Press Arm Assembly 25
3-14. GL Slider Assembly 26
3-15. Phase Adjustment 27
3-16. Gear Train Operation Check 29
3-17. Loading Motor Assembly 30
3-18. Guide Rail Base-1 Assembly 31
3-19. Guid Rail Base-2 Assembly 32
3-20. Guide Rail Base-3 Assembly 33
3-21. Capstan Motor Assembly 34
3-22. Drum Base Assembly 35
3-23. Drum Assembly 36
3-24. Replacement of Rotary Upper Drum 37
3-25. Reel Table Height Check 39
3-26. FWD/RVS Torque Check 39
3-27. Tension Regulator Position Adjustment 40
3-28. FWD Back Tension Adjustment 41

4. TAPE PATH ADJUSTMENT

4-1. Preparation for Adjustment 42
4-2. Tracking Adjustment 43
4-3. No.4 Guide (TG-4) Adjustment 43
4-4. No.11 Guide (TG-11) Adjustment 44
4-5. Check after Adjustment 45

1. PREPARATION FOR MECHANICAL CHECK, ADJUSTMENT AND MAINTENANCE

For removal of the cabinet and boards, refer to "Disassembly" in each Service Manual.
Mechanical adjustment is done in the USE mode. (To select the USE mode, refer to "1-4 Handling of Mode Selector".)

1-1 CASSETTE COMPARTMENT HOLDER ASSEMBLY (Fig. 1)

1. Removal

1) Select the USE mode.
2) Remove the screw ●, and then, the LS support ●.
3) Remove the four screws ●, and then, the LS frame assy ●.
4) Remove the three lock washers ●, and then, the washer ●, bar, joint ●, T protector assy ●, and TP arm assy ● in that order.
5) Remove the two screws ●, and then, the two arm shafts A ●.
6) Remove the shaft through the long hole ●. With the cassette compartment holder assembly ● rotated in a direction of the arrow Ⓐ, remove the long holes ● and ● from the shaft in that order, and then, remove the cassette compartment holder assembly ●.
7) Slide the BS holder ● in a direction of the arrow Ⓑ as shown in Fig. A and remove it in a direction of the arrow Ⓒ.

Note : When this is done, be careful not to drop the steel ball and spring, compression out of the BS holder ●.

2. Mounting

1) Select the USE mode.
2) Mount the BS holder ● in the reverse order of its removal. Note: Refer to Fig. A.
3) Mount the shafts in the order of the long holes ●, ● and ● of the cassette compartment holder assembly ●, respectively.

Note : When this is done, rotate the cassette compartment holder assembly ● in a direction of the arrow Ⓐ to mount it until the long hole is aligned with the oval shape of the shaft.

4) Align the oval shape of the two arm shafts A ● with the long holes of the LS chassis, fit them in firmly and fix with the two screws ●.
5) Mount the TP arm assy ●, T protector assy ● and bar, joint ●, respectively. Then, mount the washer ● and three lock washers ●.
6) Mount the LS frame assy ● to the chassis and fix with the four screws ●.
7) Mount the LS support ● to the chassis and fix with the screw ●.

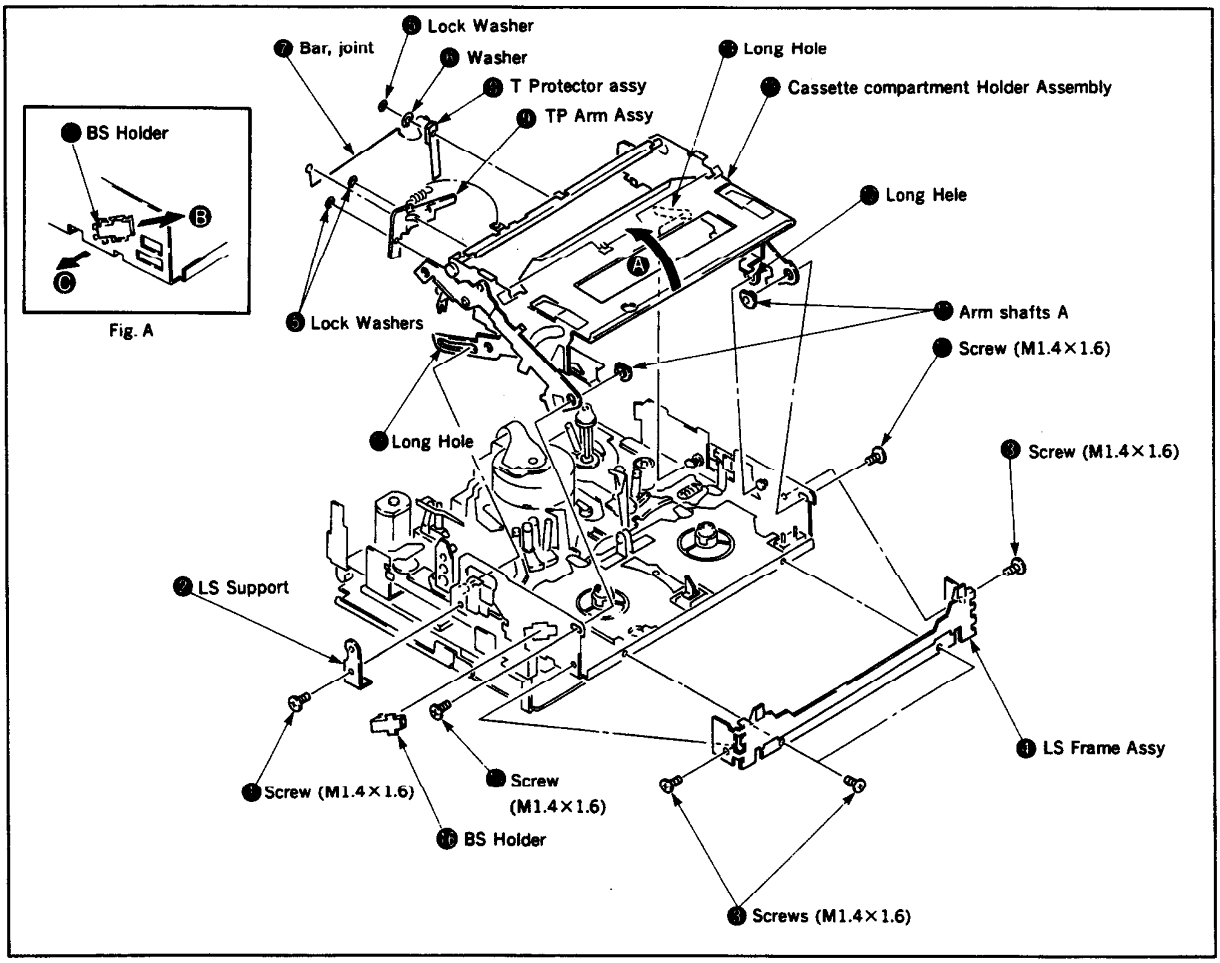

⑤ Lock Washer
⑦ Bar, joint
⑥ Washer
⑧ T Protector assy
⑨ TP Arm Assy
● Long Hole
● Cassette compartment Holder Assembly
● BS Holder
Ⓑ
Ⓒ
Fig. A
● Long Hele
Ⓐ
● Arm shafts A
● Screw (M1.4×1.6)
⑤ Lock Washers
● Screw (M1.4×1.6)
● Long Hole
● LS Support
● LS Frame Assy
● Screw (M1.4×1.6)
● Screw (M1.4×1.6)
● BS Holder
● Screws (M1.4×1.6)

Fig. 1

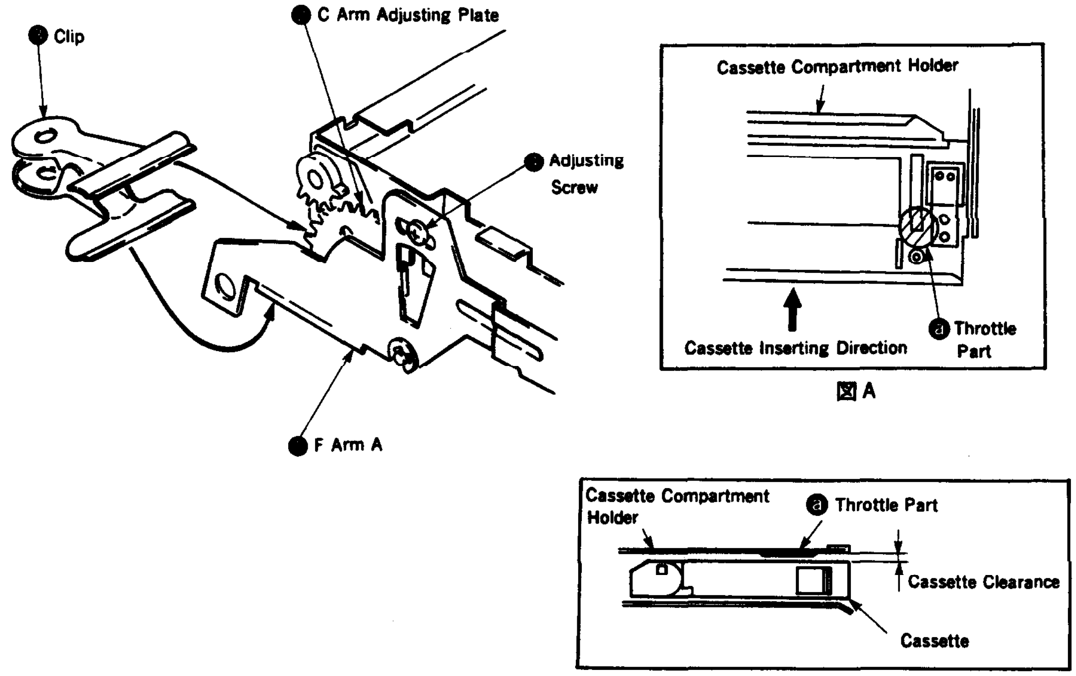
1-2 CASSETTE COMPARTMENT LOCK HEIGHT ADJUSTMENT (Fig. 2)

1) Using a spacer, etc., insert a 15.3mm-thick cassette to lock the cassette compartment.

Note : As shown in Fig. A, a 15.3mm-thick portion may be under the throttle partⓐ.

2) Pressing the partⓐ, nip the F arm A ● and the first tooth of the C arm adjusting plate ● with the clip ●, and tighten the adjusting screw ● at a torque of 1kg•cm.

3) Apply Screw Lock to the adjusting screw ● after making sure of the following clearances between the throttle partⓐ of the cassette compartment holder and the cassette as shown in Fig. B.
   - For 15mm-thick dummy cassette : 0.5 – 0.9
   - For 15.2mm-thick dummy cassette : 0.3 – 0.7


● C Arm Adjusting Plate
● Clip
● Adjusting Screw
● F Arm A
Cassette Compartment Holder
Cassette Inserting Direction
ⓐ Throttle Part
Cassette Compartment Holder
ⓐ Throttle Part
Cassette Clearance
Cassette

図A

Fig. B

Fig. 2

1-3 OPERATION WITH CASSETTE COMPARTMENT HOLDER ASSEMBLY REMOVED

1. Putting into Loading state (Fig. 3)

1) Referring to the Service Manual, supply power with the cabinet and camera section removed. (Make the mechanism deck ready to operate.)
2) Place the cap ● on the LED assembly ●.
3) Press the pin of the push switch ● (ON state) and fix it with adhesive tape ● in that state.
4) Press the locking plate release arm ● in an arrow direction. The set is made ready for loading.

2. Putting into the REC Mode

1) Short the TEST pins (SS-82 board CN404 pins ● and ● for CCD-V11/V88) to place into the TEST mode.

For CCD-V11/V88 ; SS-82 board CN404
TEST pin connector

4	GND
3	$\overline{\text{CAM ADJ}}$
2	$\overline{\text{TEST}}$
1	$\overline{\text{PATH}}$

The set is placed into the TEST mode by shorting the pins ● and ●.

2) After completing the step 1), set the power switch to VTR (or CAMERA).
3) Turn on the REC switch. (If the set is placed in the TEST mode, detection of S and T reel table rotation is disabled and the tape can run.)

3. Putting into EJECT

1) Turn on the EJECT switch.

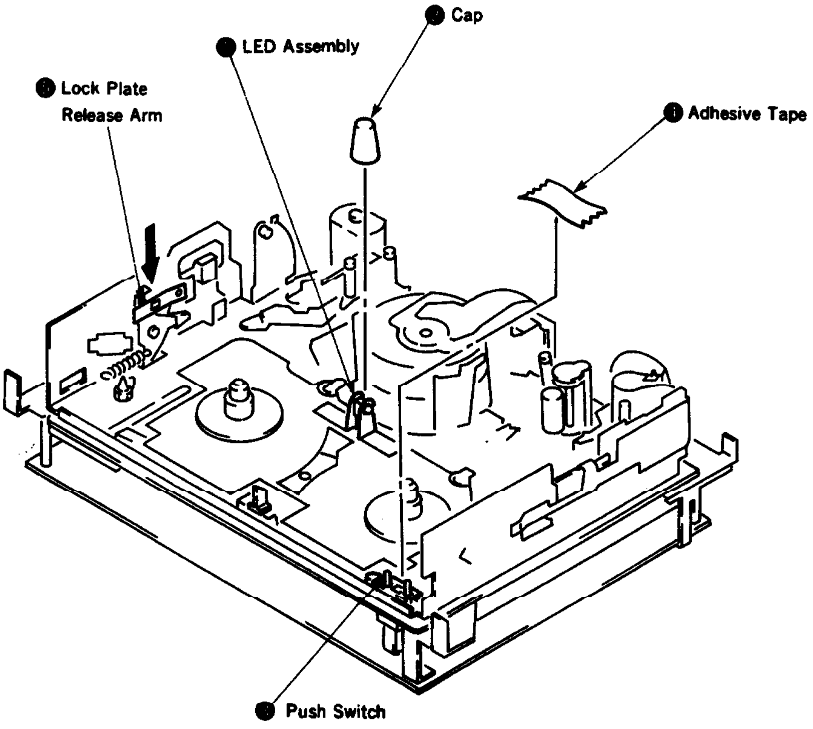


Fig. 3

1-4 HANDLING OF MODE SELECTOR

- Mount the MODE SELECTOR III panel to the mode selector. U, FL, O and O' mechanisms have different mode indications respectively. Select your disired type. (Fig. 4)

1. Construction (Fig. 5)

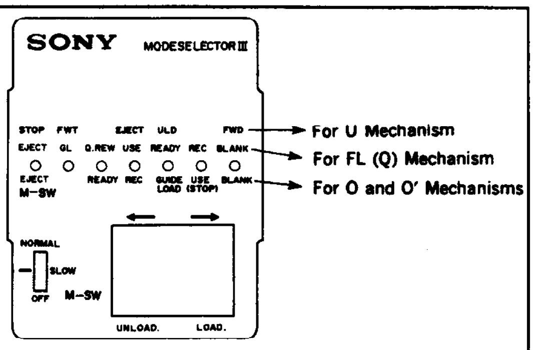
2. Connection (Fig. 6)

For CCD-VII/V88

1) Remove the plate, ornamental ●.
2) Remove the screw ●, and then, the LB-12 board ●.
3) Remove the FP-114 flexible connector ● and loading motor connector ●, and insert them into the MODE SELECTOR III conversion connector respectively.
4) Insert the M-SW connector of the mode selector into the MODE SELECTOR III conversion connector.

3. Handling

1) Use the M mode selector buttons only.
2) During mode selection, "BLANK" lights up when no mode is being selected.
3) If the right M mode selector button is kept pressed, EJECT, USE, GL, Q.REW, GL, REC and READY light up in that order.
4) When changing over from the READY mode back to the EJECT mode, press the left M mode selector button to select your desired mode.


SONY
MODESELECTOR III
STOP FWT EJECT ULD FWD
EJECT GL Q.REW USE READY REC BLANK
EJECT READY REC GUIDE LOAD USE (STOP) BLANK
M-SW
NORMAL
SLOW
OFF
M-SW
UNLOAD.
LOAD.
For U Mechanism
For FL (Q) Mechanism
For O and O' Mechanisms

Ref. No. J-13 MODE SELECTOR III Panel

Fig. 4

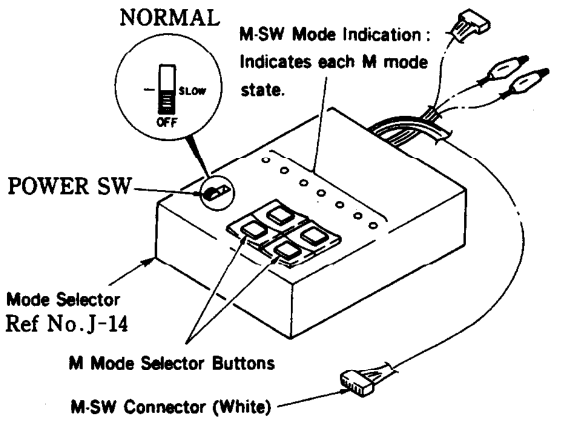

NORMAL
SLOW
OFF
M-SW Mode Indication : Indicates each M mode state.
POWER SW
Mode Selector
Ref No.J-14
M Mode Selector Buttons
M-SW Connector (White)

Fig. 5

For CCD-V11/V88

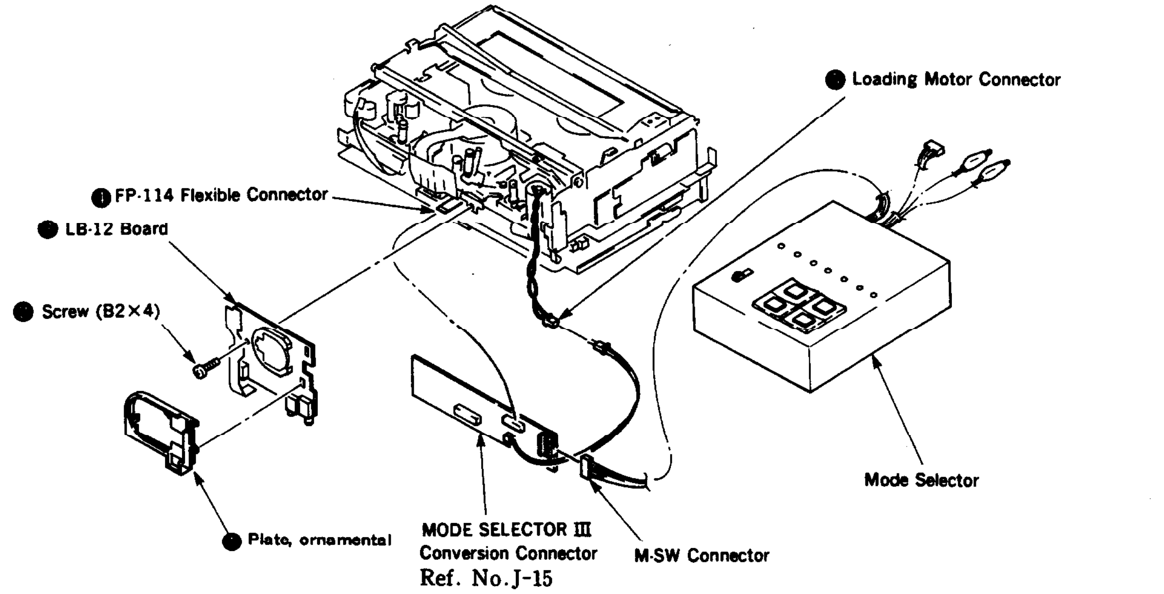
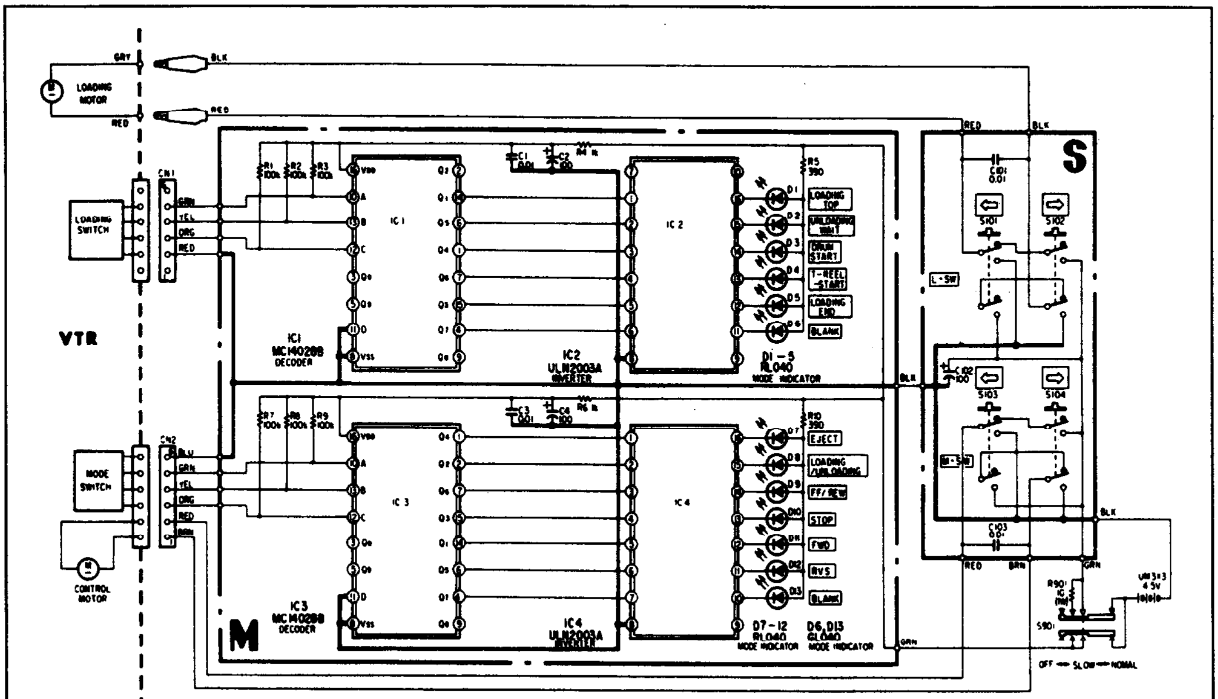

● Loading Motor Connector
● FP-114 Flexible Connector
● LB-12 Board
● Screw (B2×4)
● Plate, ornamental
MODE SELECTOR III Conversion Connector
Ref. No.J-15
M-SW Connector
Mode Selector

Fig. 6

1-5 MODE SELECTOR SCHEMATIC DIAGRAM


GRY
BLK
LOADING MOTOR
RED
CN1
LOADING SWITCH
GRN
YEL
ORG
RED
VTR
CN2
MODE SWITCH
BLU
GRN
YEL
ORG
RED
BRN
CONTROL MOTOR
R1 100k
R2 100k
R3 100k
R7 100k
R8 100k
R9 100k
C1 0.01
C2 100
R4 1k
C3 0.01
C4 100
R6 1k
VDD
A
B
C
D
VSS
IC1
IC1 MC14028B DECODER
IC2
IC2 ULN2003A INVERTER
IC3
IC3 MC14028B DECODER
IC4
IC4 ULN2003A INVERTER
R5 390
R10 390
D1
D2
D3
D4
D5
D6
LOADING TOP
UNLOADING WAIT
DRUM START
T-REEL -START
LOADING END
BLANK
D1-5 RL040 MODE INDICATOR
D7
D8
D9
D10
D11
D12
D13
EJECT
LOADING /UNLOADING
FF/REW
STOP
FWD
RVS
BLANK
D7-12 RL040 MODE INDICATOR
D6,D13 GL040 MODE INDICATOR
M
S
RED
BLK
C101 0.01
S101
S102
L-SW
C102 100
S103
S104
M-SW
C103 0.01
BLK
RED
BRN
GRN
R901 1Ω (NF)
UM3×3 4.5V
S901
OFF ⇦ SLOW ⇦ NOMAL

M-SW (IC 3)

DECODER INPUT			MODE	LED NO
C	B	A		
0	0	0		
0	0	1	FWD	D11
0	1	0	LOADING/UNLOADING	D8
0	1	1	STOP	D10
1	0	0	EJECT	D7
1	0	1	RVS	D12
1	1	0	FF/REW	D9
1	1	1	BLANK	D13

0: INPUT LEVEL L
1: INPUT LEVEL H

L-SW (IC 1)

DECODER INPUT			MODE	LED NO
C	B	A		
0	0	0		
0	0	1	LOADING TOP	D1
0	1	0		
0	1	1	LOADING END	D5
1	0	0	DRUM START	D3
1	0	1	UNLOADING WAIT	D2
1	1	0	T-REEL-START	D4
1	1	1	BLANK	D6

SWITCH		DIRECTION OF MOTOR REVOLUTION
⇦	⇨	
OFF	OFF	STOP
ON	OFF	⇦
OFF	ON	⇨

⇦ L-SW LOADING END → LOADING TOP
M-SW RVS → EJECT

⇨ L-SW LOADING TOP → LOADING END
M-SW EJECT → RVS

1-6 MODE SELECTOR PARTS LIST

Ref. No	Part No.	Description		
		CAPACITOR		
C1	1-108-579-00	MILER	0.01μF	50V
C2	1-123-333-00	ELECT	100μF	24V
C3	1-108-579-00	MILER	0.01μF	50V
C4	1-123-333-00	ELECT	100μF	24V
C101	1-108-579-00	MILER	0.01μF	50V
C102	1-123-333-00	ELECT	100μF	24V
C103	1-108-579-00	MILER	0.01μF	50V
		DIODE		
D1	8-719-812-31	DIODE TLR123		
D2	8-719-812-31	DIODE TLR123		
D3	8-719-812-31	DIODE TLR123		
D4	8-719-812-31	DIODE TLR123		
D5	8-719-812-31	DIODE TLR123		
D6	8-719-812-33	DIODE TLG123A		
D7	8-719-812-31	DIODE TLR123		
D8	8-719-812-31	DIODE TLR123		
D9	8-719-812-31	DIODE TLR123		
D10	8-719-812-31	DIODE TLR123		
D11	8-719-812-31	DIODE TLR123		
D12	8-719-812-31	DIODE TLR123		
D13	8-719-812-33	DIODE TLG123A		

Ref. No	Part No.	Description		
		IC		
IC1	8-752-240-28	IC TC4028BP		
IC2	8-752-120-03	IC μPA2003C		
IC3	8-759-240-28	IC TC4028BP		
IC4	8-759-120-03	IC μPA2003C		
		RESISTOR		
R1	1-247-179-00	CARBON	100K	1/4W
R2	1-247-179-00	CARBON	100K	1/4W
R3	1-247-179-00	CARBON	100K	1/4W
R4	1-247-131-00	CARBON	1K	1/4W
R5	1-247-121-00	CARBON	390	1/4W
R6	1-247-131-00	CARBON	1K	1/4W
R7	1-247-179-00	CARBON	100K	1/4W
R8	1-247-179-00	CARBON	100K	1/4W
R9	1-247-179-00	CARBON	100K	1/4W
R10	1-247-121-00	CARBON	390	1/4W
R901	1-214-594-00	METAL	10	1W

2. PERIODIC CHECK AND MAINTENANCE

- Carry out the following maintenance and periodic checks in order not only to fully exhibit the functions and performance of the set, but also for the equipment and tape. After repairing, service the set as follows, regarless of the length of use.

2-1 CLEANING OF ROTARY DRUM ASSEMBLY

1) Gently apply chamois cloth (Ref. No. J-2) soaked in cleaning liquid (Ref. No. J-1) to the rotary drum assembly.
   Clean it by rotating the upper rotary drum assembly slowly counterclockwise by hand.

Note : Do not rotate the motor by power or rotate the upper rotary drum assembly clockwise by hand. Also, the head tip is highly likely to be damaged if the chamois cloth is moved in a pependicular direction to the it. Make sure to follow the instructions above for cleaning the rotary drum assembly.

2-2 CLEANING OF TAPE PATH (Fig. 7)

1) In the EJECT mode, clean the tape running system (TG-1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, pinch roller, and capstan shaft) and the lower drum, using a superfine applicator (Ref. No. J-3) soaked in the cleaning liquid.

Note : Note that no oil or grease of each link mechanism adheres to the superfine applicator (Ref. No. J-3).

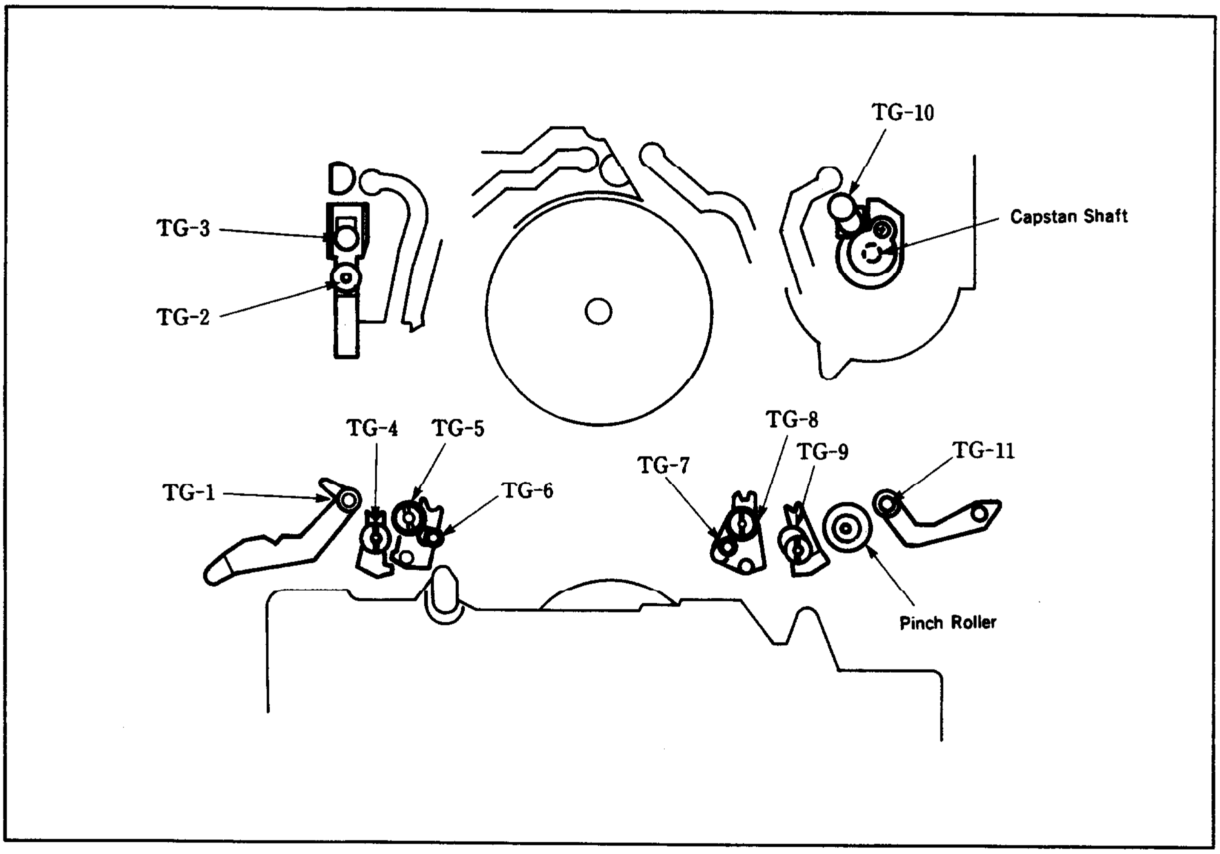


Fig. 7

2-3 PERIODIC CHECK ITEMS

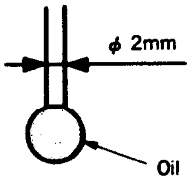
Location of Maintenance and check		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
		Hours of Use (H)										
Tape transportion System	Cleaning of tape path surface	○	○	○	○	○	○	○	○	○	○	Be careful of oil
	Cleaning and degaussing of rotary assembly	○	○	○	○	○	○	○	○	○	○	Be careful of oil
Driving System	Relay belt	—	☆	—	☆	—	☆	—	☆	—	☆	3-728-212-01
	Capstan shaft	—	◎	—	◎	—	◎	—	◎	—	◎	Be adsolutely careful not to get oil on the tape path surface.
	Relay pulley sheft	—	◎	—	◎	—	◎	—	◎	—	◎	
	Loading motor	—	☆	—	☆	—	☆	—	☆	—	☆	1-541-607-11
Performance Confirmation	Abnormal noise	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
	Back tension measurement	—	☆	—	☆	—	☆	—	☆	—	☆	
	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
	FWD. RVS torque measurement	—	☆	—	☆	—	☆	—	☆	—	☆	

○ : Cleaning ◎ : Oil ☆ : Confirmation

Note : When overhauling, refer to the items above to replace parts.

Note : Concerning oil

- Be sure to use specified oil. (If you use oil with different visicosity, etc., it may cause troubles.)
  Oil : Part No. 7-661-018-18 (Mitsubishi Diamond Oil Hydrofluid NT-68)
- When lubricating bearings, be sure use oil free from dust, etc. (If you use oil with dust, etc. contained, it may cause bearings to be worn out or seized.)
- A drip of oil refers to an amount attached to the tip of a ϕ 2mm stick shown in the right figure.

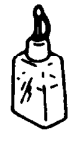


2-4 Service jigs list

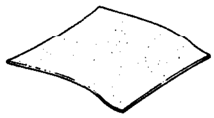
Ref. No.	Neme	Part No.	Fixture No.	Usage and Others
J-1	Cleasing fluid	Y-2031-001-0	—	
J-2	Cleasing cloth	2-034-697-00	—	
J-3	Super fine applicator (Made by NIPPON APPLICATOR, P752D)		—	
J-4	Head degausser	Widely available	—	
J-5	Small mirror for adjustment Spare mirror	J-6080-029-A J-6080-030-1	SL-5052	Tape path
J-6	Alignment tape NTSC (WR5-1N) PAL (WR5-1C)	8-967-995-01 8-967-995-06		Tape path
J-7	Dial tension gauge	J-6080-827-A		Various torque measurement
J-8	Tension measurement reel	J-6080-831-A		With ϕ30 tape
J-9	FWD and RVS winding torque cassette	J-6080-824-A	GD-2086	
J-10	Drum screwdriver (Hexagonal wrench screwdriver)	7-700-766-01		
J-11	Screwdriver for tape path	J-6082-026-A		For tape guide adjustment
J-12	Mode selector III panel	J-6082-023-A		
J-13	Mode selector	J-6080-825-A		For all models
J-14	Mode selector III conversion connector	J-6082-021-A		

Other equipment
- Oscilloscope
- Analog tester (20kΩ)

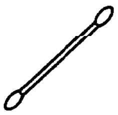
J-1



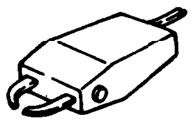
J-2



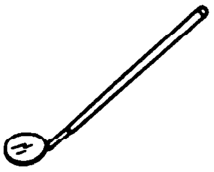
J-3



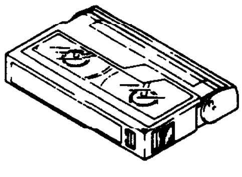
J-4



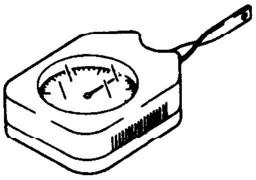
J-5



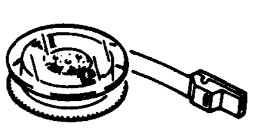
J-6



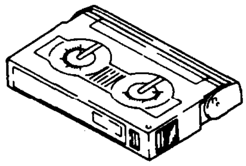
J-7



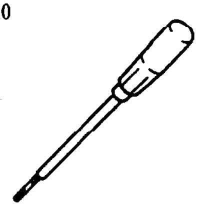
J-8



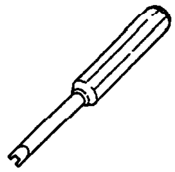
J-9



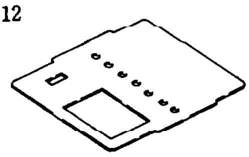
J-10



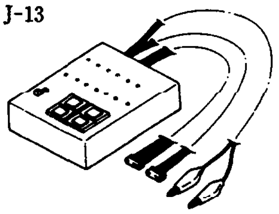
J-11



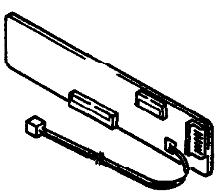
J-12



J-13



J-14



3. MECHANICAL CHECK, ADJUSTMENT AND REPLACEMENT

Note : Use the mode selector (Ref. No. J-14) for the following mechanical checks, adjustments and replacements.

Note : The modes in ☐ are those set by pressing the mode selector buttons.

3-1 LED BASE (Fig. 8)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder assembly.
3) As shown in Fig. A. rotate the LED in a direction of the arrow Ⓐ and remove it in a direction of the arrowⒷ.
4) Remove the three screws ●, ● and ●.
5) Lifting the LED base ●, remove it by pushing it in a direction of the arrowⒸ.

Note : Dismount and remount the LED base carefully, because its holder is easily deformed.

2. Mounting

1) Select the USE mode.
2) Put the claw ● of the LED base ● in the notch ● of the LS chassis without catching the LED in between. Next, fit to the dowels ● at 2 places.
3) Mount and tighten the screws ●, ● and ● in that order.
4) As shown in Fig. B, set the LED in a direction of the arrowⒶ and rotate it in a direction of the arrowⒷ to fix.
5) As shown in Fig. C, bend a flexible boord and put it in the holder.

Note : In the step2), make sure that the barring ● of the arm assy, gear can appears in the hole of the LED base. (Fig. D)

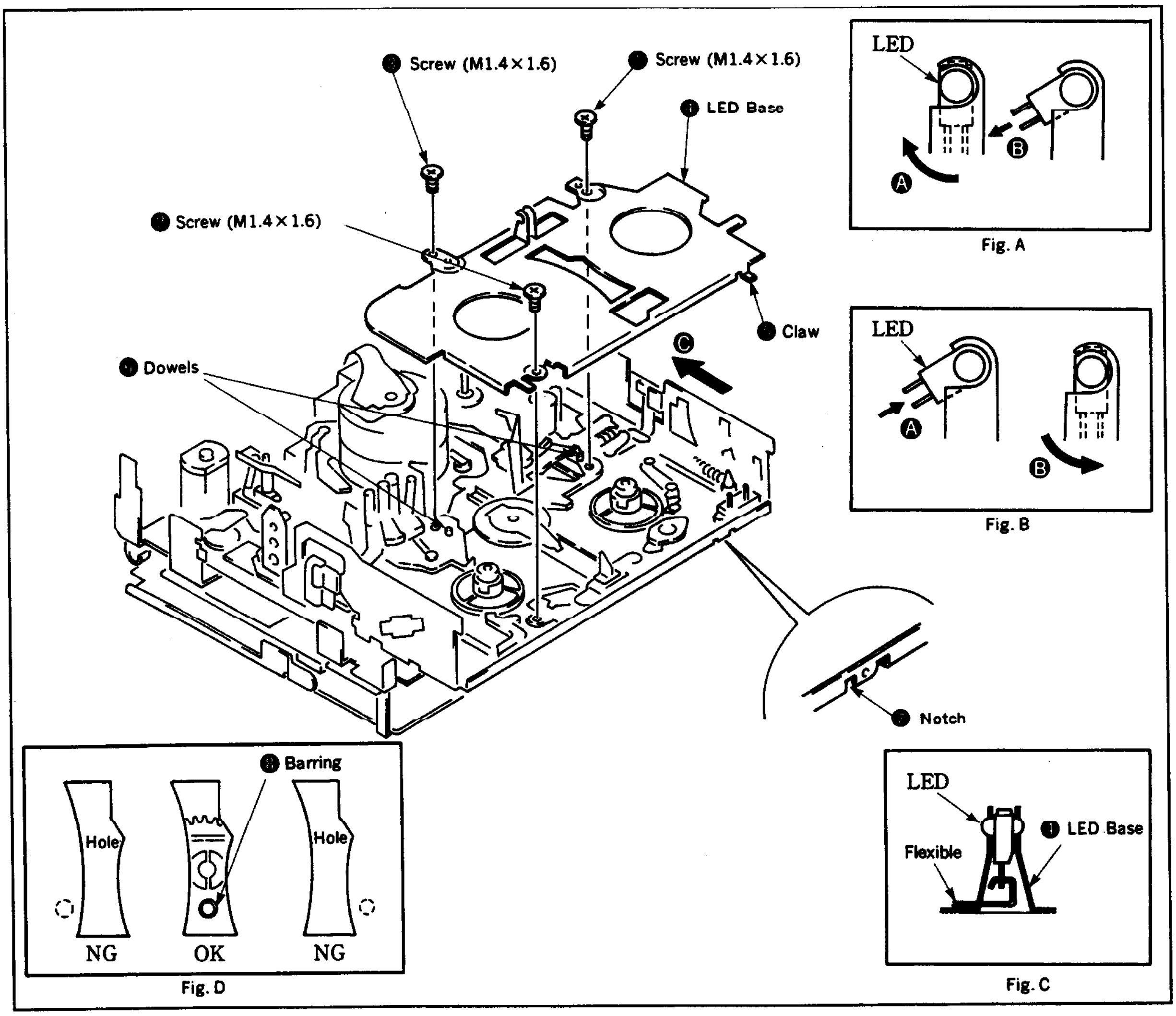


Fig. A

Fig. B

Fig. D

Fig. C

Fig. 8

3-2 RL BASE ASSEMBLY, RETAINER (Fig. 9)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder assemlby.
3) Referring to 3-1, remove the LED base.
4) Remove the screw ●, and then, retainer ●.
5) Remove the screw ●, and then, RL base assembly ●.

2. Mounting

1) Select the USE mode.
2) With the screw ●, mount the RL base assembly ● to the LS chassis.
3) With the screw ● fix the retainer ● to the RL base assembly ●.
   When this is done, align the bump part ⁕ of the retainer ● with the bump part ⁕ of the guide rail T. (Fig. A)
4) Referring to 3-1, mount the LED base.
5) Referring to 1-1, mount the cassette compartment holder assembly.

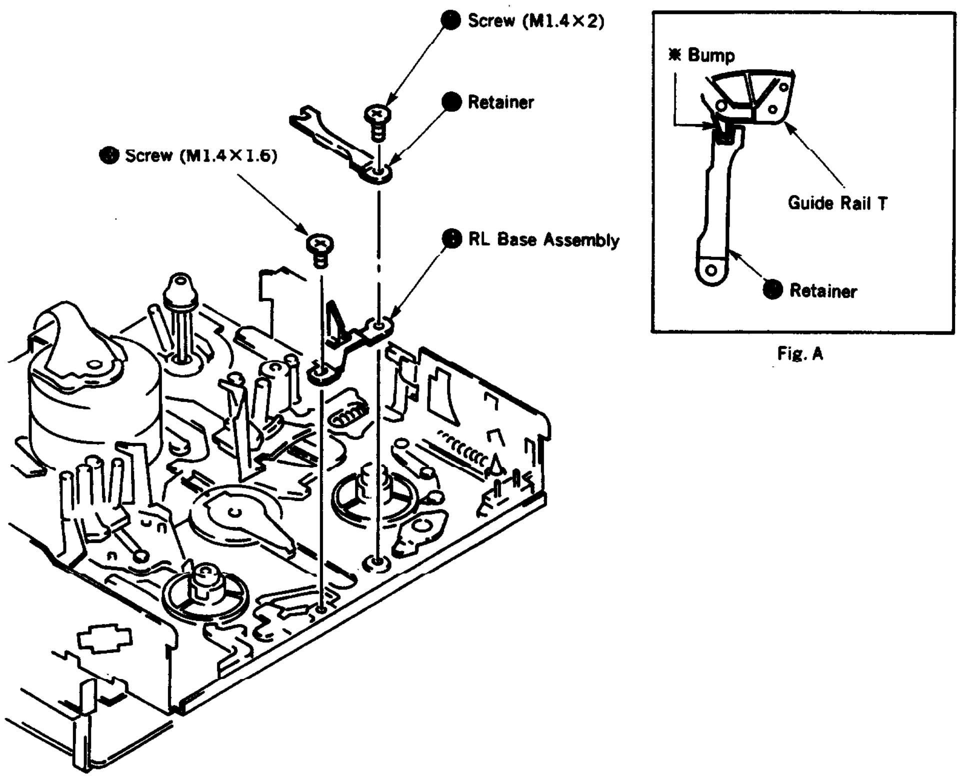

● Screw (M1.4×2)
● Retainer
● Screw (M1.4×1.6)
● RL Base Assembly
⁕ Bump
Guide Rail T
● Retainer
Fig. A

Fig. 9

3-3 TABLE ASSY, REEL, SUPPLY (Fig. 10)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder assembly.
3) Referring to 3-1, remove the LED base.
4) As shown in Fig. A, making use of slackness of the tension regulator string ● in the USE mode, remove the string out of the groove of the table assy, reel, supply ●. When this is done, be careful not to bend the tension regulator string ● and the S soft arm ● must be moved in a direction of the arrow Ⓑ.
5) Remove the table assy, reel, supply ●.

Note : Dismount and remount the table assy, reel, supply ●, holding the reel claw ✱.

2. Mounting

1) Select the USE mode.
2) As shown in Fig. B, move the S soft arm ● in a direction of the arrow Ⓑ.
3) Avoiding the tension regulator string ●, mount the table assy, reel, supply ● to the shaft ●.
4) Put the tension regulator string ● in the groove of the table assy, reel, supply ● and fit it properly by turning the table assy, reel, supply ●.
5) Referring to 3-1, mount the LED base.
6) Referring to 1-1, mount the cassette compartment holder assembly.

Note : Do not touch the tension regulator string ● with naked hand. Also, be careful of adhesion of grease, etc.

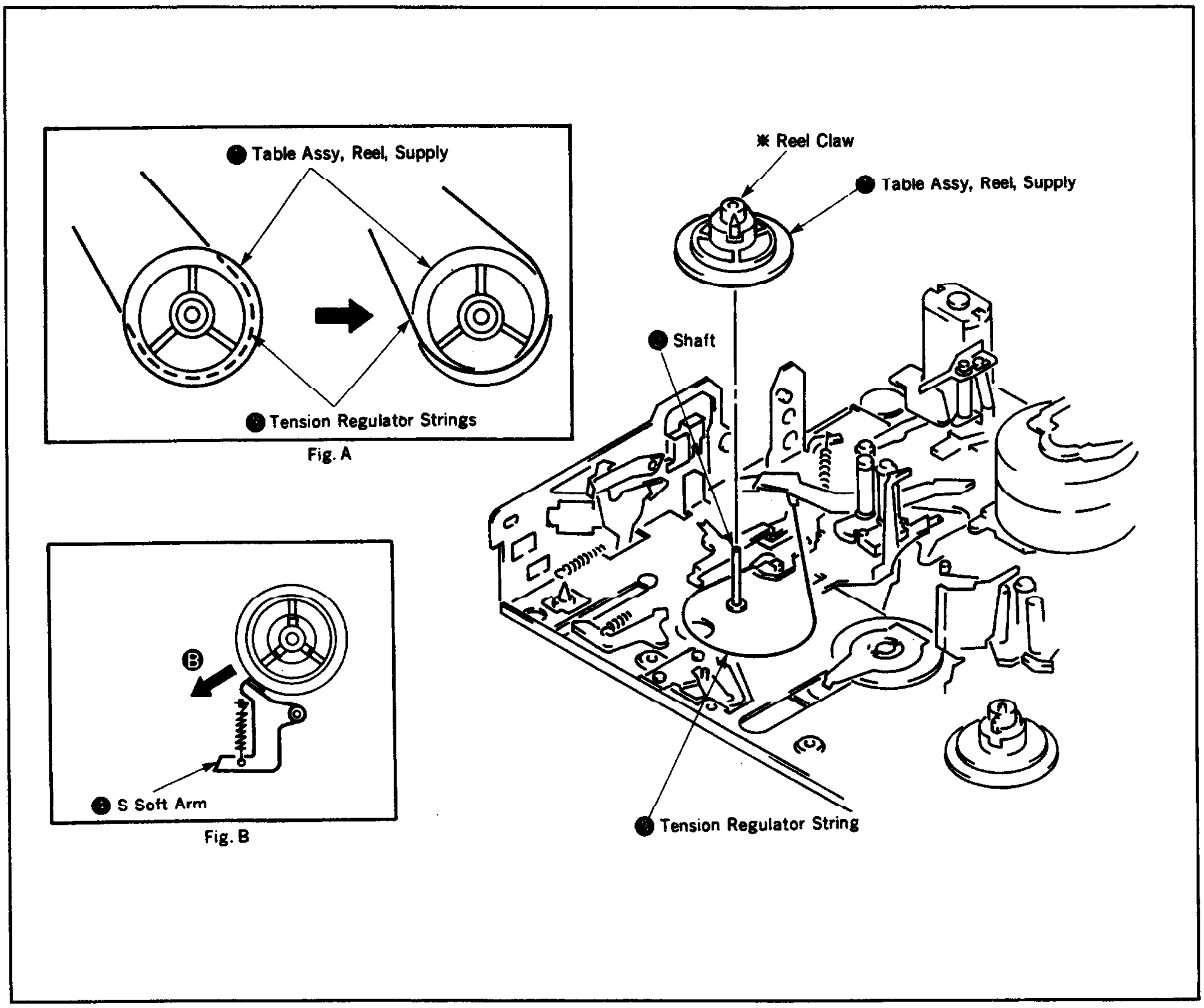

● Table Assy, Reel, Supply
● Tension Regulator Strings
Ⓑ
● S Soft Arm
✱ Reel Claw
● Table Assy, Reel, Supply
● Shaft
● Tension Regulator String

Fig. A

Fig. B

Fig. 10

3-4 TABLE ASSY, REEL, TAKE-UP (Fig. 11)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder assembly.
3) Referring to 3-1, remove the LED base.
4) Referring to 3-2, remove the retainer.
5) Dispace the T ratchet ● in a direction of the arrowⒶ.
6) With the claw (T ratchet head) of the T ratchet ● moved in a direction of the arrowⒷ, remove the Table assy, reel, take-up ●.

Note : Dismount and remount the Table assy, reel, take-up ●, holding the reel claw ✱.

2. Mounting

1) Select the USE mode.
2) With the claw (T ratchet head) of the T ratchet ● moved in an arrow direction, mount the Table assy, reel, take-up ● to the shaft ●.
3) Referring to 3-2, mount the retainer.
4) Referring to 3-1, mount the LED base.
5) Referring to 1-1, mount the cassette compartment holder assembly.

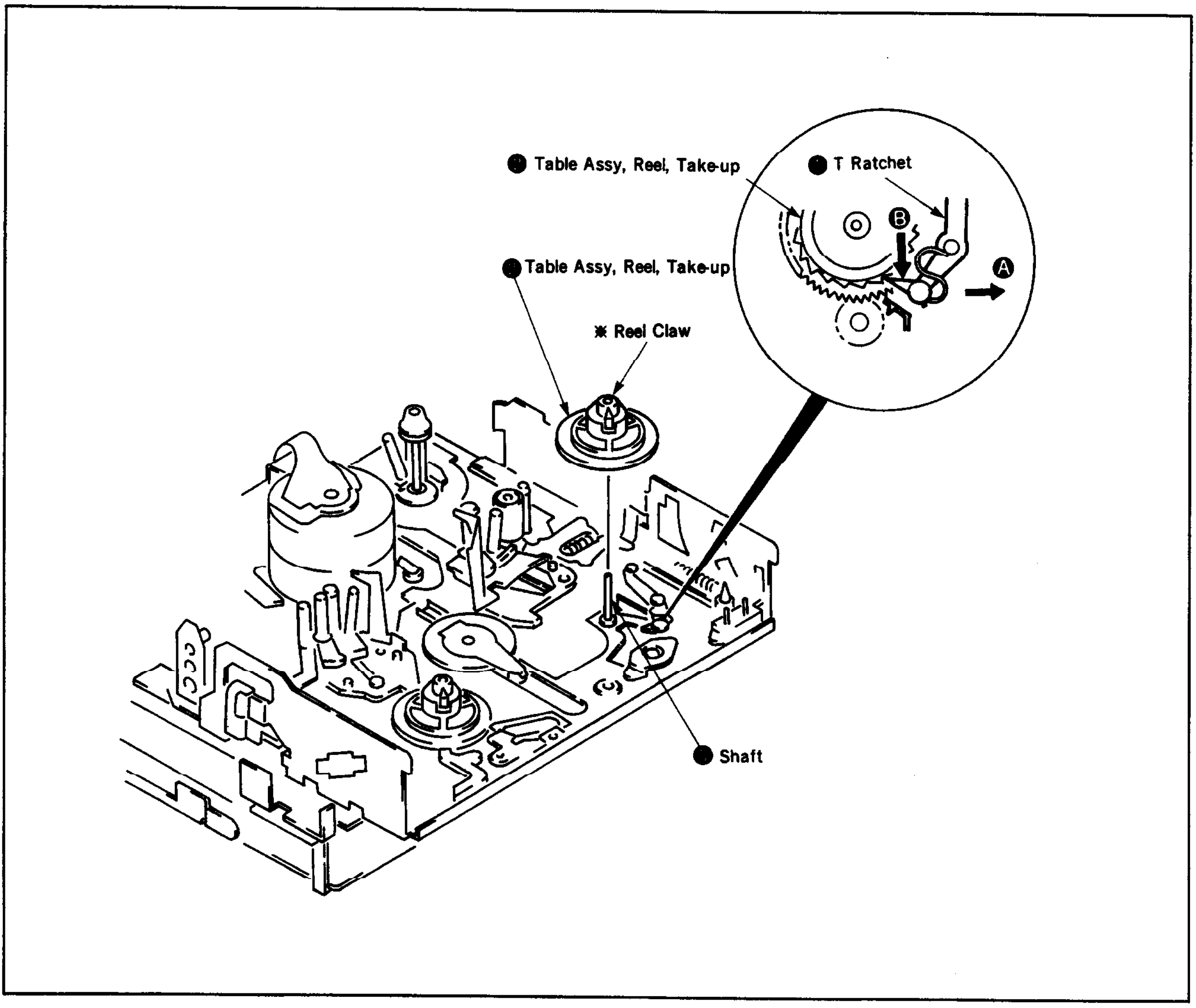


Fig. 11

3-5 ONEWAY CLUTCH ASSEMBLY (Fig. 12)

1. Removal

1) Select the [USE] mode.
2) Referring to the cassette compartment holder assembly.
3) Referring to 3-1, remove the LED base.
4) Remove the screw ●, and then, oneway clutch assembly ●.

2. Mounting

1) Select the [USE] mode.
2) Mount the oneway clutch assembly ● to the LS chassis and fix with the screw ●.
3) Referring 3-1, mount the LED base.
4) Referring to 1-1, mount the cassette compartment holder assembly.

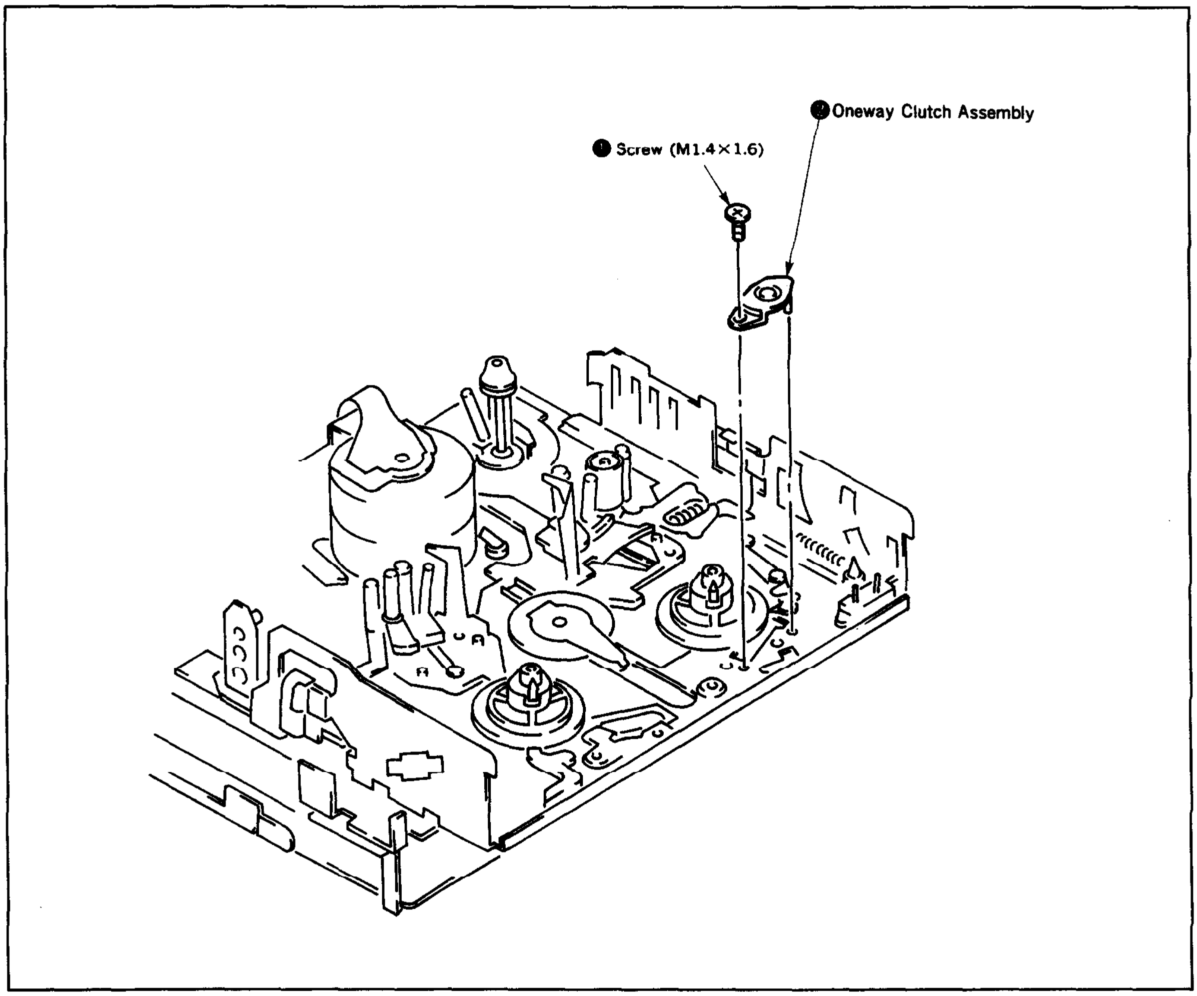


Fig. 12

3-6 S SOFT ARM ASSEMBLY (Fig. 13)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder assembly.
3) Referring to 3-1, remove the LED base.
4) Rerove the lock washer ●, and then, the spring, tension ●.
5) Remove the S soft arm assembly ● by rotating it in an arrow direction (until the hook ● comes off the LS chassis).

2. Removal

1) Select the USE mode.
2 As shoms in Fig. A, apply a quarter drip of oil to the arrowir dicated part of the shaft ●.
3) Mount the S soft arm assembly ● to the shaft ●, rotating it ii as arrow direction. (Be careful not to bend the hook ●.)
4) Hook the spring, tension 2 onto the claw and fix it with locl washer 1.
5) Referring to 3-1, mount the LED base.
6) Referring to 1-1, mount the cassette compartment holdei assembly.

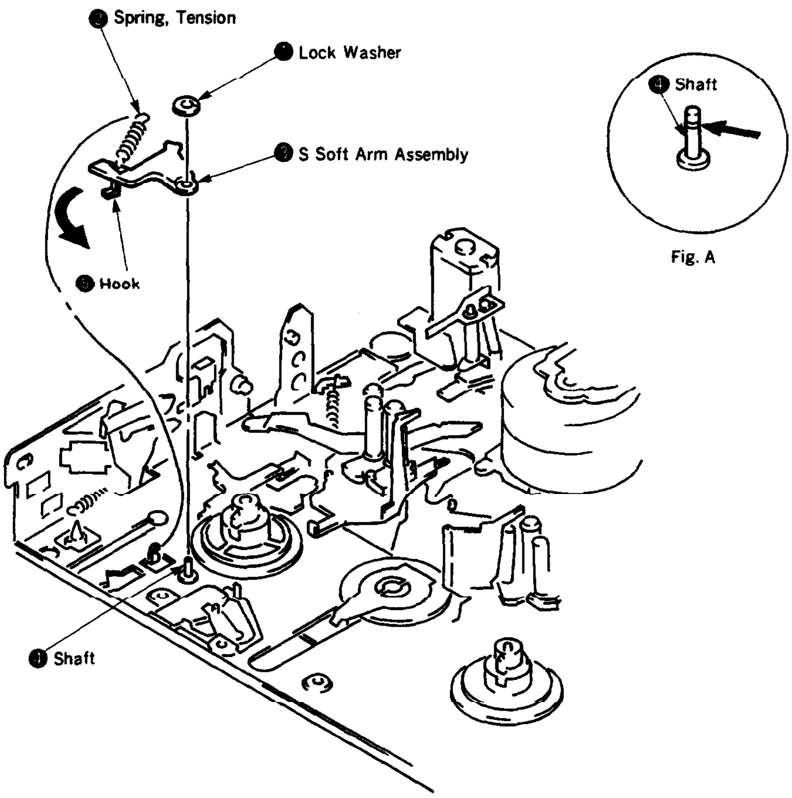


Fig. A

Fig. 13

3-7 LS CHASSIS ASSEMBLY (Fig. 14)

1. Removal

1) Select the USE mode.
2) Referring to 1-1, remove the cassette compartment holder.
3) Referring to 3-1, remove the LED base.
4) Referring to 3-2, remove the RL base assembly and retainer.
5) Remove the lock washer ❶, and then, arm assy gear ❷.
6) Select the Q, REW mode.
7) Remove the flexible rotary shaft ❸, and then, the flexible connector ❹.
8) Remove the E retaining ring ❺ and three screws ❻.
9) Remove the LS chassis assembly ❼ in a direction of the arrow Ⓓ.

2. Mounting

1) As shown in Fig. A, apply Molyton grease to the arrow-indicated part of the LS chassis assembly ❼.
2) Unload in the RDY mode. Start docking in the Q, REW mode after first GL. When docking the mechanical chassis and LS chassis assembly ❼, it is necessary to place the following parts at specified positions.
3) Put the pin ㉔of the pinch arm assembly ㉓into the left side of the pinch press arm assembly㉕. (Fig.19)
4) Move the TG-1 arm assembly⓯in a direction of the arrow Ⓐ to put the pin ⓰into the concave of the arm assembly ⓱. (Fig. 17)
5) put the pin⓳of the S ratchet⓲into the right side the of the arm assembly⓱. (Fig. 17)

Simultaneously performing the operations above, push the roller of the guide lock arm ❽ With the arm arc portion of the guide arm T assembly❿ (Fig. 15) to push the LS chassis assembly ❼ in a direction of the arrow Ⓔ, and at the same time, engage the claws of the guide rail base 1⓫, guide rail base 2⓬and guide rail base3⓭with those of the guide rail S㉕ and guide rail T㉖. (Fig. 16)

Then, align the shafts ❾ of the mechanical chassis With the four long joints of the LS chassis assembly ❼, and put the LS pin㉑of the LS arm assembly⓴in the groove of the LS cam plate㉒. (Fig.18)

Note : Before docking, confirm that both EJ arm and LS arm are deeply inserted into the shafts. (If not properly fit, the set does not function even if the LS chassis is docked.

6) Mount the E retaining ring ❺ and three screws ❻.
7) Mount the flexible rotary shaft ❸ and flexible connector ❹.
8) Select the USE mode.
9) Mount the arm assy gear ❷ and fix with the lock washer ❶.
10) Referring to 3-2, mount the RL base assembly and retainer.
11) Referring to 3-1, mount the LED base.
12) Referring to 1-1, mount the cassette compartment holder assembly.

Note : Using the mode selector, confirm that loading and unloading are performed smoothly.

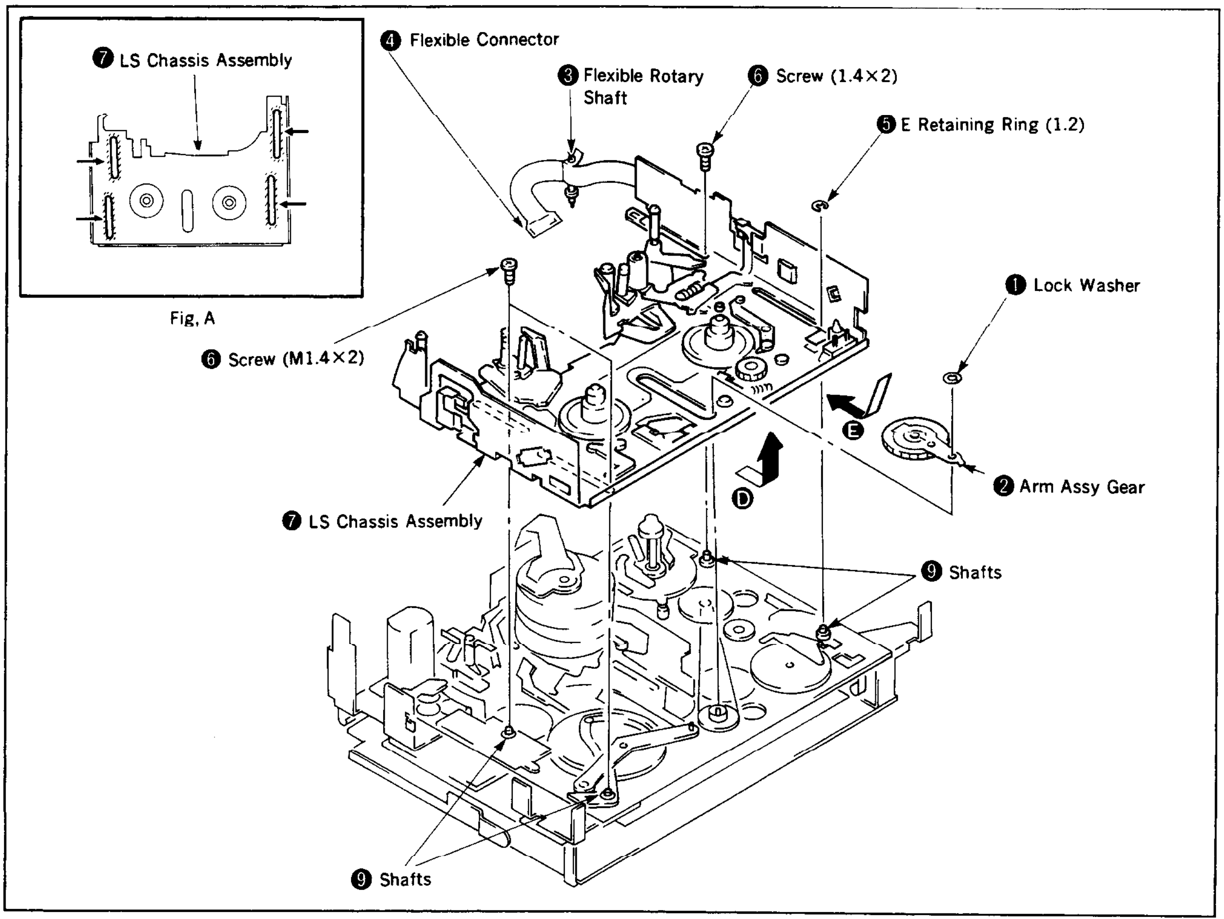


Fig. 14

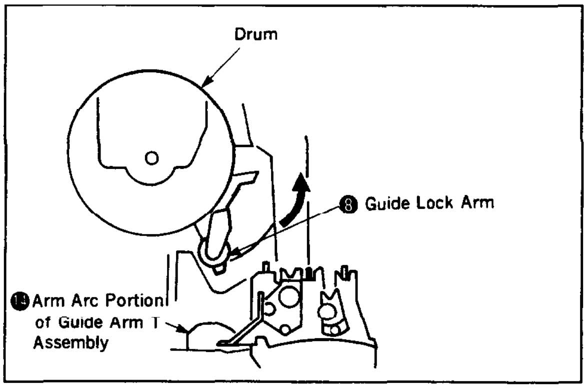

Drum
⑧ Guide Lock Arm
⑭ Arm Arc Portion of Guide Arm T Assembly

Fig. 15

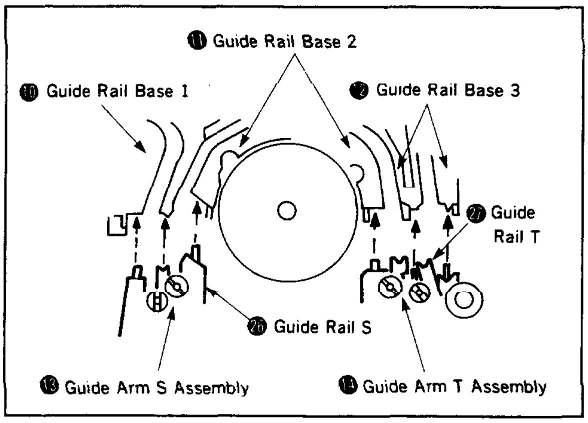

⑪ Guide Rail Base 2
⑩ Guide Rail Base 1
⑫ Guide Rail Base 3
㉗ Guide Rail T
㉖ Guide Rail S
⑬ Guide Arm S Assembly
⑭ Guide Arm T Assembly

Fig. 16

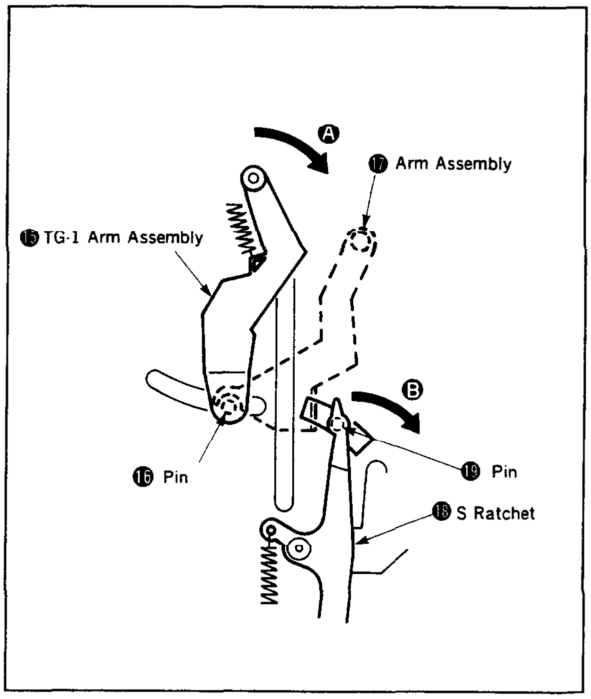

Ⓐ
⑰ Arm Assembly
⑮ TG-1 Arm Assembly
Ⓑ
⑯ Pin
⑲ Pin
⑱ S Ratchet

Fig. 17

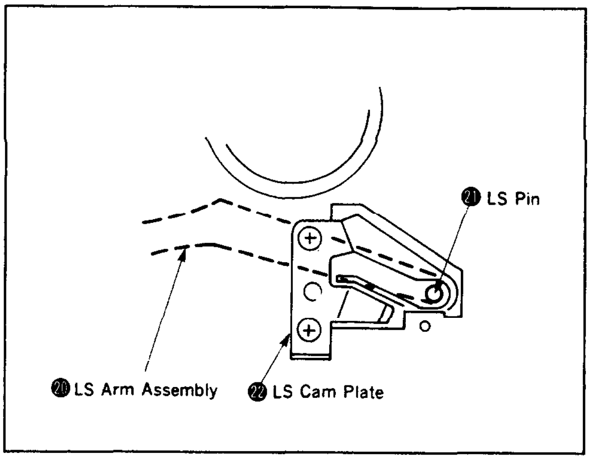

㉑ LS Pin
⑳ LS Arm Assembly
㉒ LS Cam Plate

Fig. 18

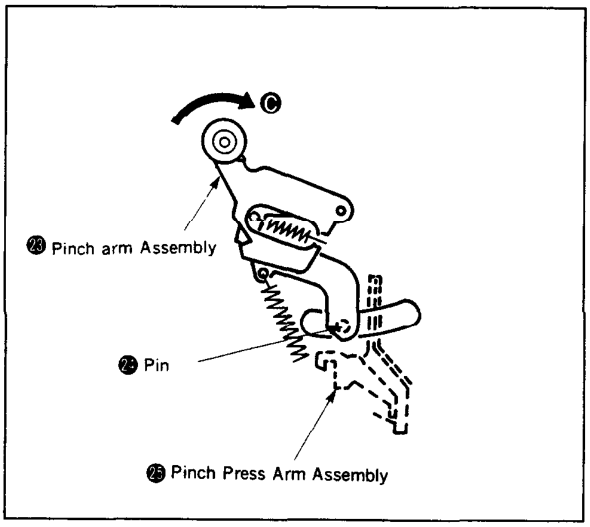

Ⓒ
㉓ Pinch arm Assembly
㉔ Pin
㉕ Pinch Press Arm Assembly

Fig. 19

3-8 PINCH ARM ASSEMBLY (Fig. 20)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis assembly.
3) Remove the lock washer ❷ from the back of the LS chassis assembly ❶.
4) Remove the spring, tension ❸, and then, pinch arm assembly ❹.

2. Mounting

1) As shown in Fig. A, apply oil to the hole of the boss ❺ over one third of a drip up to half a drip.
2) put the rotation center of the pinch arm assembly in the boss ❺ hole, and the pin ❻ in the long hole.
3) Hook the spring, tension ❸ onto the upper groove of the pinch return spring shaft ❼.
4) Mount the lock washer ❷ from the back of the LS chassis assembly ❶.
5) Referring to 3-7, mount the LS chassis assembly.
6) Referring to 1-1, mount the cassette compartment holder assembly.

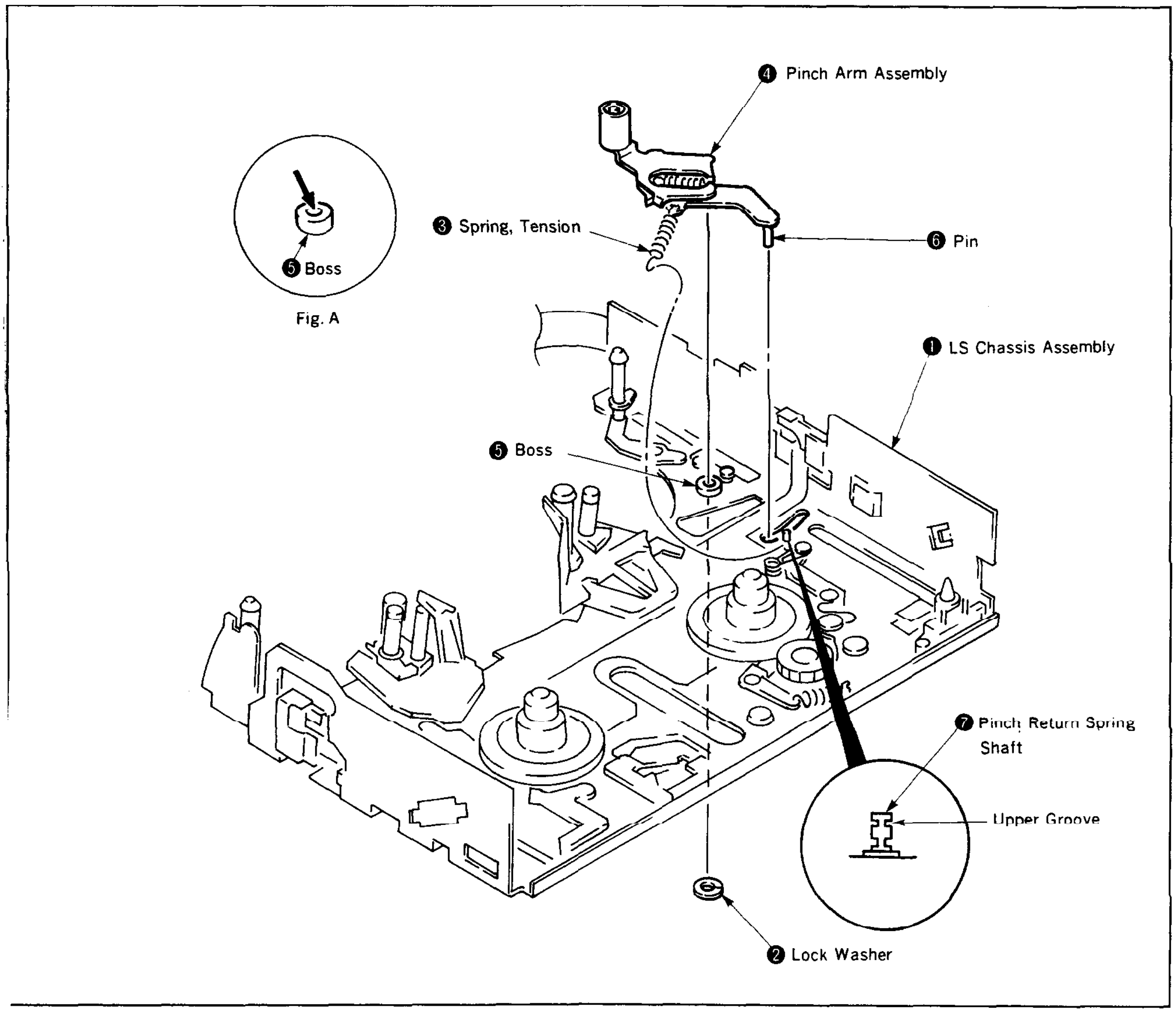

❹ Pinch Arm Assembly
❸ Spring, Tension
❻ Pin
❺ Boss
Fig. A
❶ LS Chassis Assembly
❺ Boss
❼ Pinch Return Spring Shaft
Upper Groove
❷ Lock Washer

Fig. 20

3-9 TG-11 ARM ASSEMBLY (Fig. 21)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis assembly.
3) Remove the lock washer ❷ from the back of the LS chassis assembly ❶.
4) Remove the TG-11 arm assembly ❸ and spring, torsion ❹.

Note : Be careful not to deform the TG-11 arm.

2. Mounting

1) As shown in Fig. A, apply oil to a boss hole over one third of a drip up a half a drip.
2) As shown in Fig. B, put the longer arm of the spring, torsion ❹ between the pinch arm boss ❺ and cam slider shaft ❽ of the LS chassis. Next, Hook the shorter arm of the spring, torsion ❹ around the pin ❻ of the TG-11 arm assembly ❸, rotate the TG-11 arm assembly and fix with the lock washer ❷. When this is done, see to it that the pin ❻ of the TG-11 arm assembly ❸ is located to the left side of the cam slider ❾ as shown in Fig. C.
3) Referring to 3-7, mount the LS chassis.
4) Referring to 1-1, mount the cassette compartment holder.

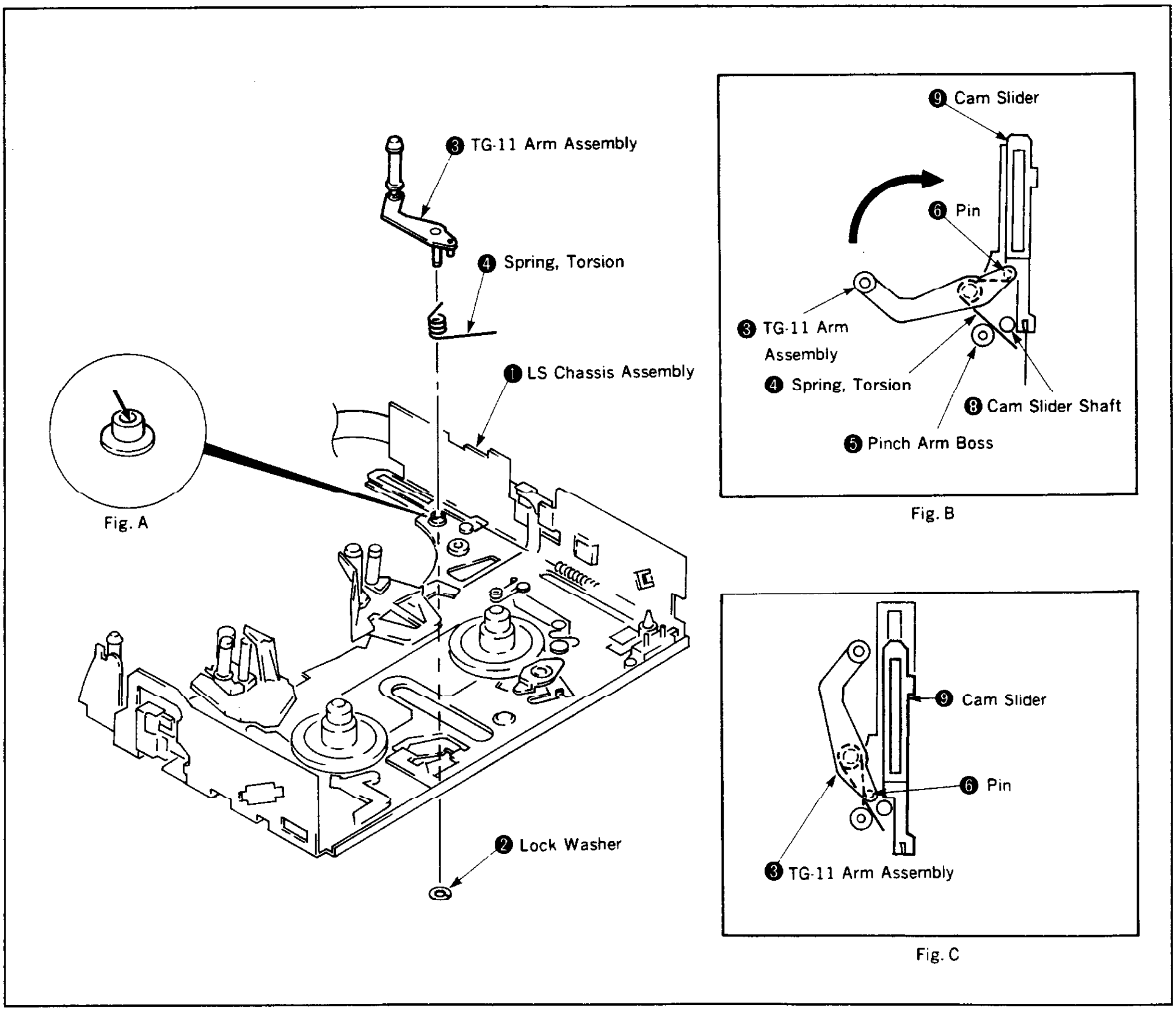

❸ TG-11 Arm Assembly
❹ Spring, Torsion
❶ LS Chassis Assembly
❷ Lock Washer
❾ Cam Slider
❻ Pin
❸ TG-11 Arm Assembly
❹ Spring, Torsion
❽ Cam Slider Shaft
❺ Pinch Arm Boss
❾ Cam Slider
❻ Pin
❸ TG-11 Arm Assembly

Fig. A

Fig. B

Fig. C

Fig. 21

3-10 TG-1 ARM ASSEMBLY (Fig. 22)

1. *Removal*

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis.
3) Referring to 3-3, remove the table assy, reel, supply.
4) Remove the lock washer ❷ from the back of the LS chassis assembly ❶.
5) Remove the spring, tension ❸. Remove the string joint ❹ from the dowel ❺ of the TG-1 adjustment block ❾ by rotating it in a direction of the arrow Ⓐ as shown in Fig. C.
6) Remove the TG-1 arm assembly ❻.

Note : Dismount and remount the string joint ❹ carefully not to deform it.

2. *Mounting*

1) As shown in Fig. A, apply oil to the hole of the boss ❼ over one third of a drip up to half a drip.
2) As shown in Fig. C, mount the string joint ❹ to the TG-1 adjustment block ❾ in the opposite direction of the arrow Ⓐ.
3) Mount the TG-1 arm assembly ❻ to the boss ❼ in such a manner not to touch the guide and insert the pin ❽ into the long hole.
4) Hook the spring, tension ❸ onto the position shown in Fig. B.
5) Mount the lock washer ❷ from the back of the LS chassis assembly ❶.
6) Referring to 3-3, mount the table assy, reel, supply.
7) Referring to 3-7, mount the LS chassis assembly.
8) Referring to 1-1, mount the cassette compartment holder assembly.

Note : Referring to 3-27, adjust a tension regulator position.

Note : Referring to 3-28. adjust a FWD back tension.

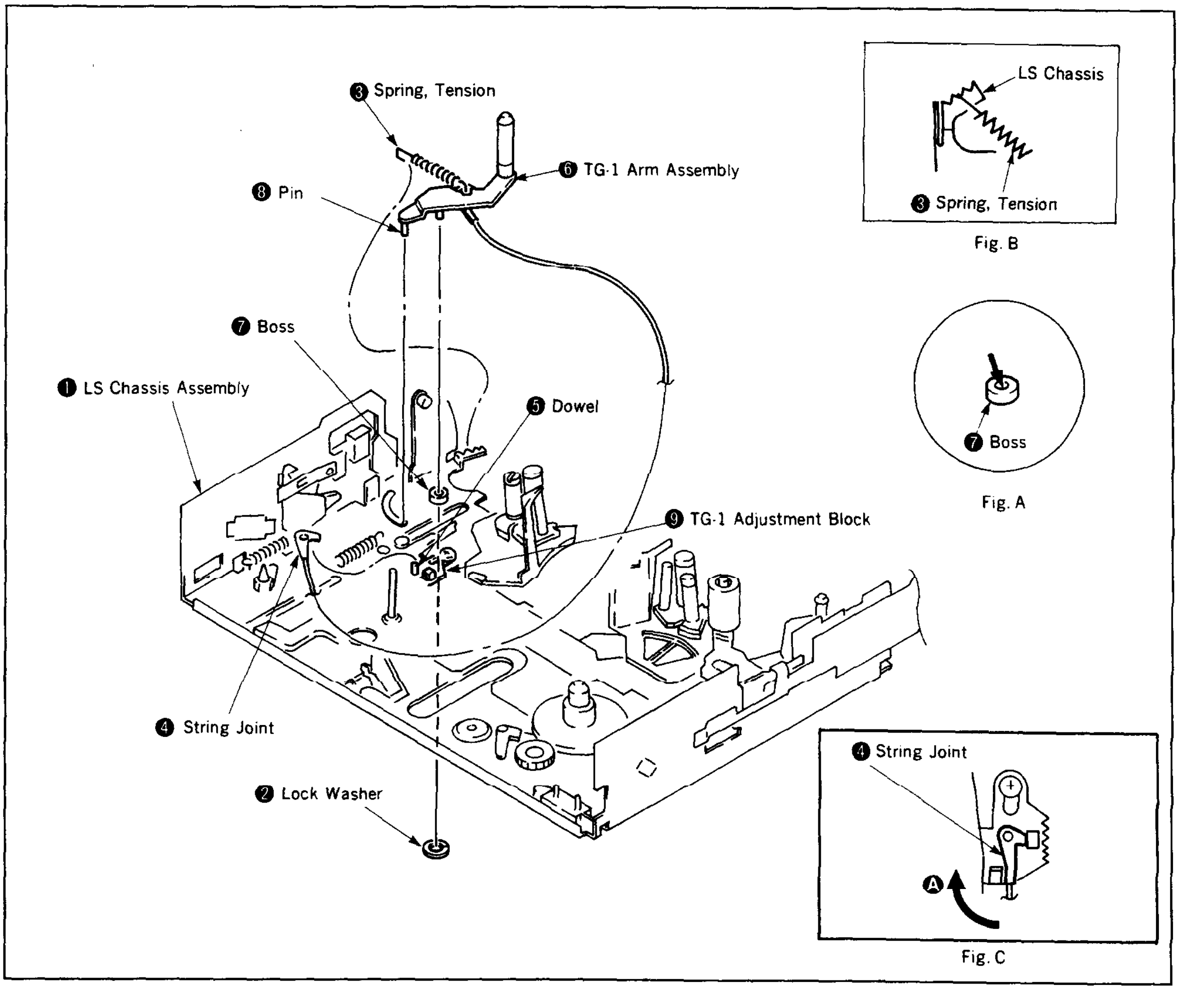

❸ Spring, Tension
❻ TG-1 Arm Assembly
❽ Pin
❼ Boss
❶ LS Chassis Assembly
❺ Dowel
❾ TG-1 Adjustment Block
❹ String Joint
❷ Lock Washer
LS Chassis
❸ Spring, Tension
❼ Boss
❹ String Joint
Ⓐ

Fig. B

Fig. A

Fig. C

Fig. 22

3-11 STRING JOINT (Fig. 23)

1. Removal

1) Referring to 3-10, remove the TG-1 arm assembly ❶.
2) Remove the joint holder ❷, and then, string assembly ❸.

2. Mounting

1) Put the dowel ❹ of the TG-1 arm assembly ❶ into the hole of the string assembly ❸ and mount the joint holder ❷. (Apply screw lock between the joint holder and TG-1 arm assembly.)
2) Referring to 3-10, mount the TG-1 arm assembly ❶.

Note : Be careful not to bend the string assembly ❸.

Note : Do not touch the guide ※.

Note : The joint holder ❷, which was removed once, must not be used again.

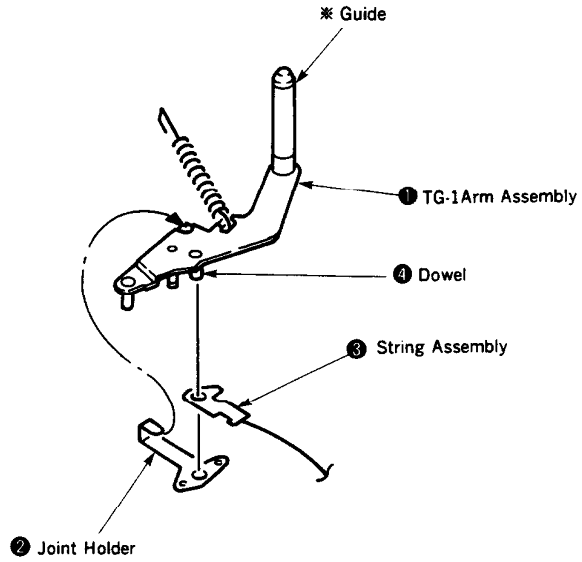

※ Guide
❶ TG-1Arm Assembly
❹ Dowel
❸ String Assembly
❷ Joint Holder

Fig. 23

3-12 GUIDE ARM T ASSEMBLY, GUIDE ARM S ASSEMBLY

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis assembly.
3) Rotate the guide arm T assembly ❶ and guide arm S assembly in arrow directions respectively, align their shafts ❸ with the holes as shown in Fig. A, and remove them. (Fig. 24)

Note : Do not touch the guide ※. (Fig. 25 and Fig. 26)

2. Mounting

1) After inserting the guide arn T and S assemblies in the reverse order of removal, rotate them in the opposite directions of the arrows respectively.
2) Fit the TG-7 base assembly ❺ and TG-9 base assembly ❻ in the grooves of the guide rail T ❹. (Fig. 25)
3) Put the shaft ❼ flange in the long groove of the guide rail S ❽, and fit the TG-4 base assembly ❾ and TG-6 base assembly ❿ into the right and left grooves of the guide rail S ❽ respectively.
   When this is done, see to it that the flat spring of the TG-6 base assembly❿ is located below the guide rail S ❽ as shown in Fig. B. (Fig.26)
4) Referring to 3-7, mount the LS chassis assembly.
5) Referring to 1-1, mount the cassette compartment holder assembly.

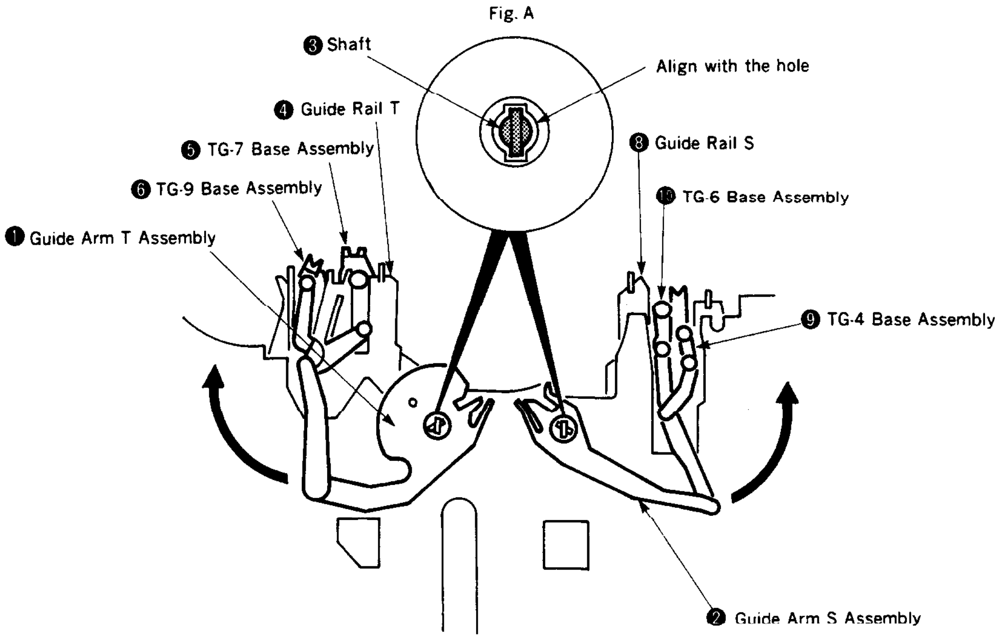


Fig. A
❸ Shaft
Align with the hole
❹ Guide Rail T
❺ TG-7 Base Assembly
❽ Guide Rail S
❻ TG-9 Base Assembly
❿ TG-6 Base Assembly
❶ Guide Arm T Assembly
❾ TG-4 Base Assembly
❷ Guide Arm S Assembly

LS Chassis Assembly Viewed from Back

Fig. 24

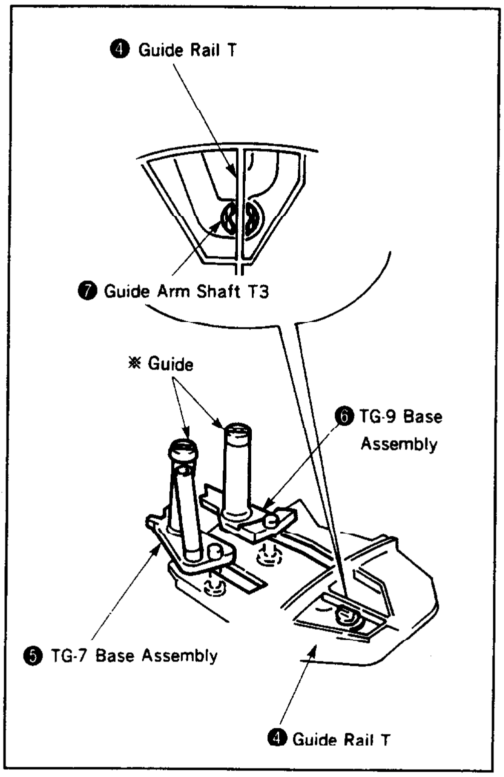

❹ Guide Rail T
❼ Guide Arm Shaft T3
※ Guide
❻ TG-9 Base Assembly
❺ TG-7 Base Assembly
❹ Guide Rail T

Fig. 25

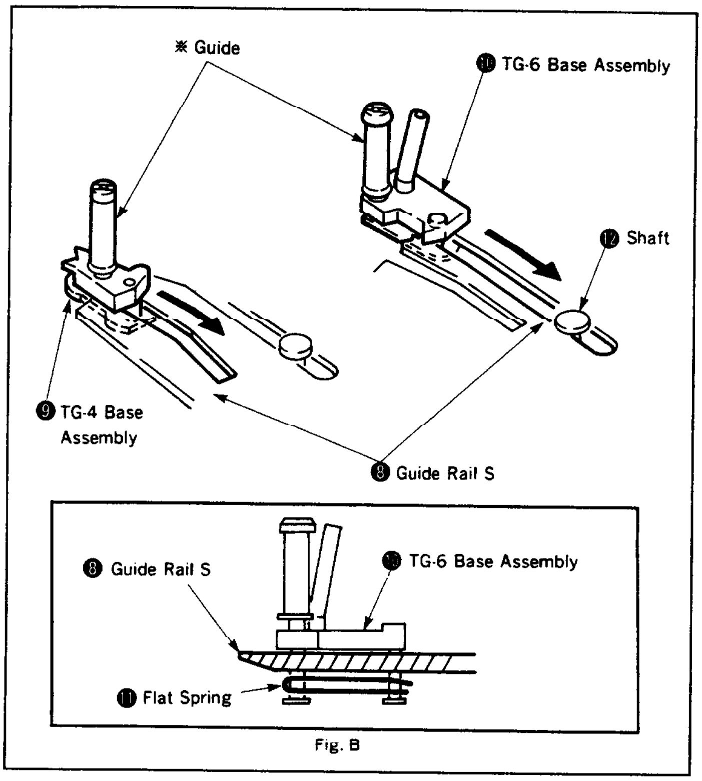

※ Guide
❿ TG-6 Base Assembly
⓬ Shaft
❾ TG-4 Base Assembly
❽ Guide Rail S
❽ Guide Rail S
❿ TG-6 Base Assembly
⓫ Flat Spring
Fig. B

Fig. 26

3-13 PINCH PRESS ARM ASSEMBLY (Fig. 27)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis.
3) Remove the screw ❶, and then, pinch press arm assembly ❷.

2. Mounting

1) As shown in A, apply half a drip of molyton grease to an arrowindicated part of a boss hole.
2) As shown in Fig. B, apply half a drip of molyton grease each to the pinch press arm assembly ❷ at 3 places.
3) Put the pin ❹ of the pinch press arm assembly ❷ in the groove of the cam B ❸.
4) Fix. with the screw ❶.
5) Referring to 3-7, mount the LS chassis assembly.
6) Referring to 1-1, mount the cassette compartment holder assembly.

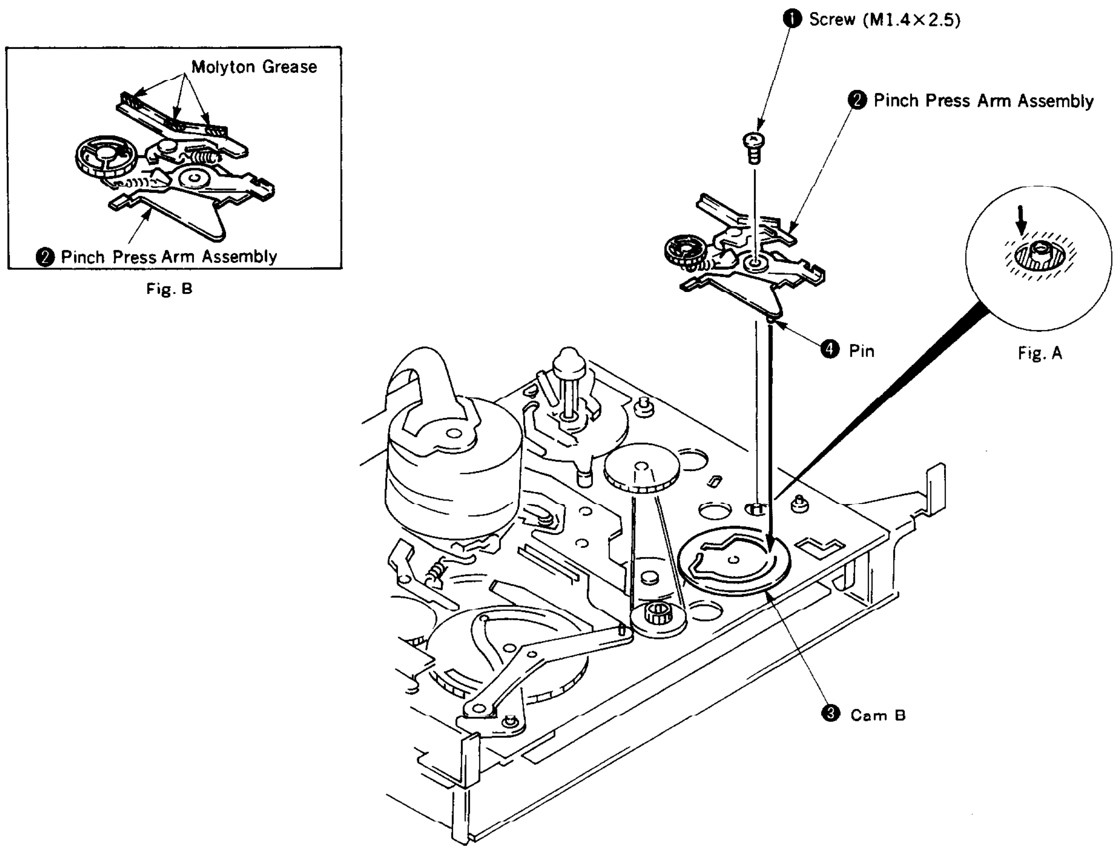

Molyton Grease
❷ Pinch Press Arm Assembly
Fig. B
❶ Screw (M1.4×2.5)
❷ Pinch Press Arm Assembly
❹ Pin
Fig. A
❸ Cam B

Fig. 27

3-14 GL SLIDER ASSEBLY (Fig. 28)

1. Removal

1) Refering to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis assembly.
3) Referring to 3-15, remove the cam A.
4) Shift the GL slider assembly ❹ in a direction of the arrowⒶ.
5) Remove the screw ❶, and then, GL support S ❷.
6) Remove the lock washer ❸, and then, GL slider assembly ❹.

2. Mounting

1) Fit the claw ❺ of the GL slider assembly ❹ in the groove of the GL support T ❼, and put the roller ❻ in the long hole of the chassis.
2) Stop with the lock washer ❸.
3) Shift the GL slider assembly ❹ in a direction of the arrowⒶ.
4) Fit the claw ❽ of the GL support ❷ in the part of the chassis marked with ※ and place the dowel ❾ in the hole of the chassis.
5) Fix with the screw ❶.
6) Referring to 3-7, mount the LS chassis assembly.
7) Referring to 1-1, mount the cassette compartment holder assembly.

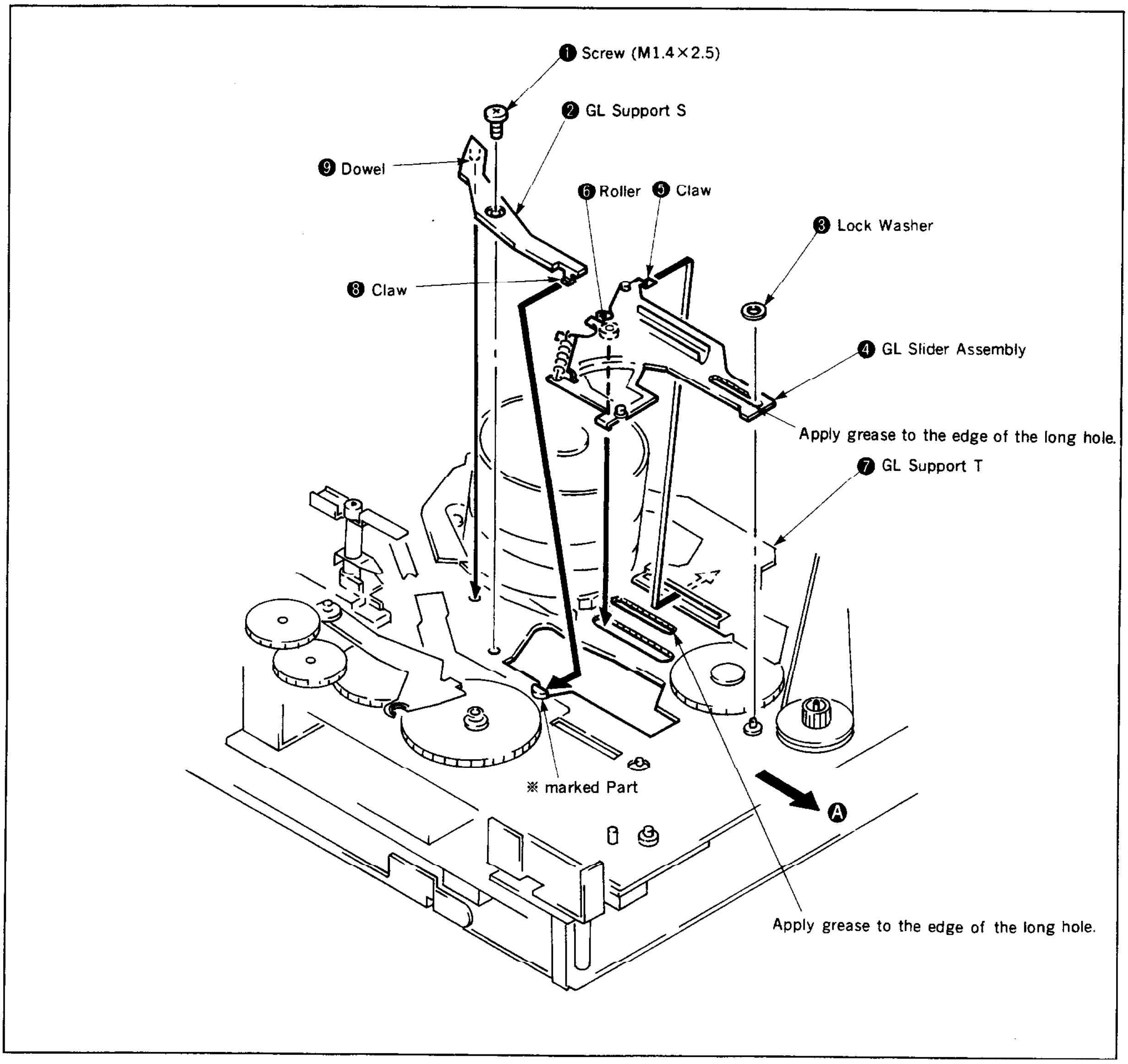

❶ Screw (M1.4×2.5)
❷ GL Support S
❾ Dowel
❻ Roller
❺ Claw
❸ Lock Washer
❽ Claw
❹ GL Slider Assembly
Apply grease to the edge of the long hole.
❼ GL Support T
※ marked Part
Ⓐ
Apply grease to the edge of the long hole.

Fig. 28

3-15 PHASE ADJUSTMENT(Fig. 29)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis. (Wen this is done, one of the BLANK, REC and READY modes must be selected.)
3) Remove the two screws ❶, and remove the TG-1 cam base ❷ by moving it in a direction of the arrow Ⓐ. (Remove the notch ㉒ from the groove of the No. 3 gear shaft.)
4) Remove the screw ❸, and remove the gear retainer ❹ by sliding it in a direction of the arrow Ⓑ.
5) Remove the arm assembly ❺, No. 0 gear ❻, No. 1 gear assembly ❼, No. 2 gear assembly ❽, No. 3 gear assembly ❾, lock washer ㉓, and then, mode gear assembly ❿, respectively.
6) Being careful not to lose the LS roller ㉔ of the LS arm, remove the LS arm assembly ⓫ and EJ arm ⓬, respectively.
7) Remove the screw ⓭, and then, cam A ⓮.
8) Referring to 3-13 3), remove the pinch press arm assembly.
9) Remove the screw ⓯, and then, cam B ⓰.

2. Adjustment and Mounting

1) Face the hole ⓐ of the mode gear assembly ❿ to a direction of the arrow Ⓐ, move the GL slider assembly ⓱ in a direction of the arrow Ⓑ, apply molyton grease to the pin of the GL slider assembly ⓱, and mount the LS roller ㉔. (Fig. 30)
2) Set a direction of the cam A ⓮ so that the hole Ⓒ of the cam A ⓮ will be aligned with the hole of the mechanical chassis. (Fig. 31)
3) Move the GL slider ⓱ so that the LS roller ㉔ will be placed into the groove ⓓ of the cam A ⓮. At the same time, engage the mode gear assembly ❿ with the gear of the relay gear A ⓳, and mount the cam A ⓮. Insert a stick of about ϕ1.5mm in the hole Ⓒ of the cam A ⓮. (Fig. 31)
4) Align the hole ⓔ of the cam B ⓰ with the hole of the mechanical chassis. At the same time, engage the relay gear B ⓴ with the gear and mount it. (Fig. 32)
5) Referring to 3-13, mount the pinch press arm assembly.
6) Align the hole ⓕ of the No. 3 gear assembly ❾ with the hole of the mechanical chassis, and at the same time, engage the mode gear assembly ❿ with the gear to mount. (Fig. 33)
7) Mount the No. 2 gear assembly ❽, No. 1 gear assembly ❼ and No. 0 gear ❻ in that order. Mount the arm assembly ❺ to the shaft and put the pin ㉑ in the groove of the No. 3 gear assembly ❾, (Fig. 34)
8) Put the TG-1 cam base ❷ in place, fit the notch ㉒ to the shaft and shift it in an arrow direction, and mount the screws ❶ and ❶ in that order. (Fig. 35)
9) Put the gear retainer ❹ in place, slide it in an arrow direction and fix it with the screw ❸. (Fig. 36)
10) Seeing to it that the EJ arm ⓬ and the LS roller ㉔ of the LS arm assembly ⓫ are put in the groove ⓖ of the cam A ⓮, mount them in that order. (Fig. 29 and Fig. 30)
11) Referring to 3-7, mount the LS chassis assembly.
12) Referring to 1-1, mount the cassette compartment holder assembly.

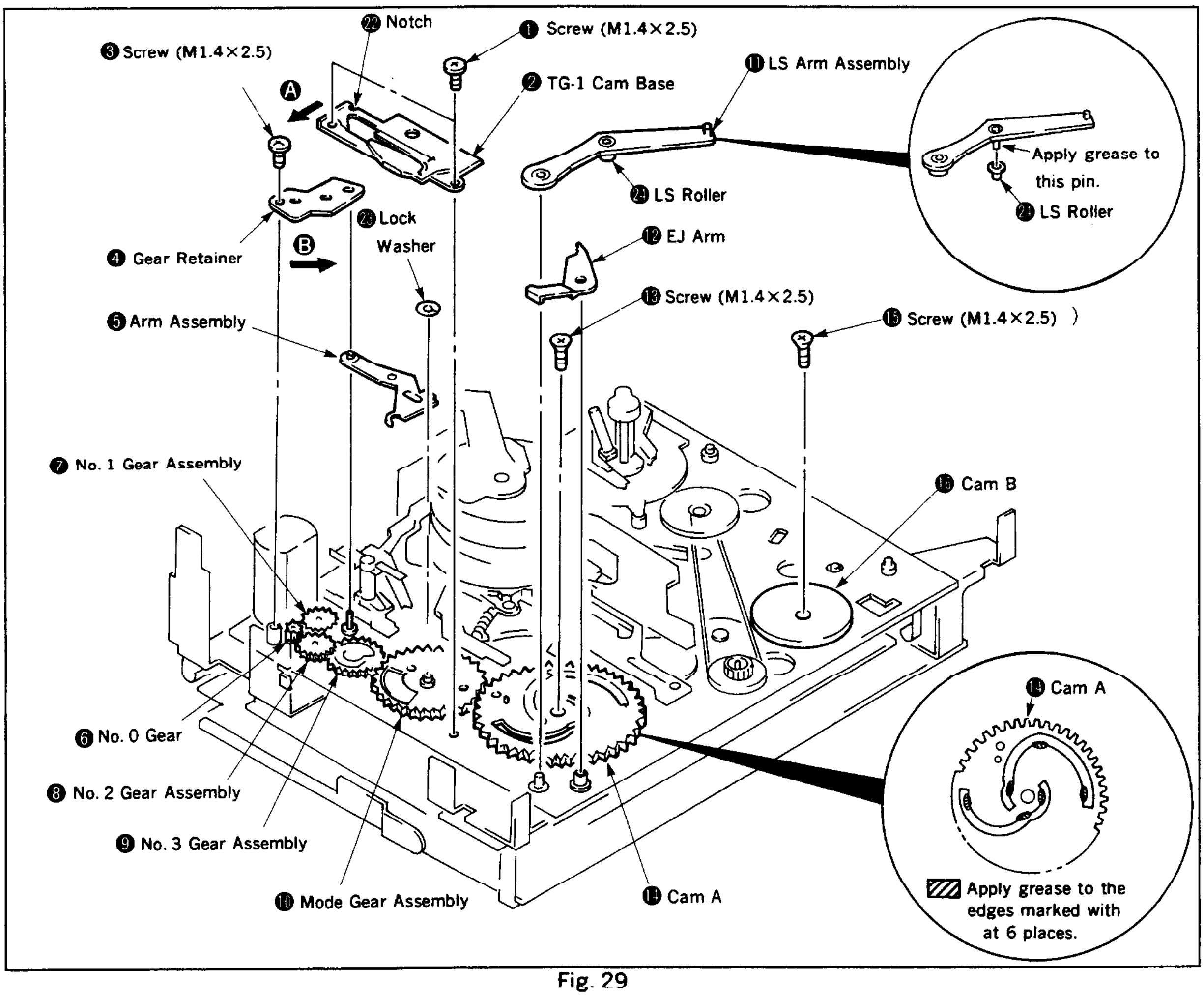

㉒ Notch
❶ Screw (M1.4×2.5)
❸ Screw (M1.4×2.5)
❷ TG-1 Cam Base
⓫ LS Arm Assembly
Ⓐ
Apply grease to this pin.
㉔ LS Roller
㉔ LS Roller
㉓ Lock Washer
⓬ EJ Arm
❹ Gear Retainer
Ⓑ
⓭ Screw (M1.4×2.5)
⓯ Screw (M1.4×2.5)
❺ Arm Assembly
❼ No. 1 Gear Assembly
⓰ Cam B
⓮ Cam A
❻ No. 0 Gear
❽ No. 2 Gear Assembly
❾ No. 3 Gear Assembly
❿ Mode Gear Assembly
⓮ Cam A
▨ Apply grease to the edges marked with at 6 places.

Fig. 29

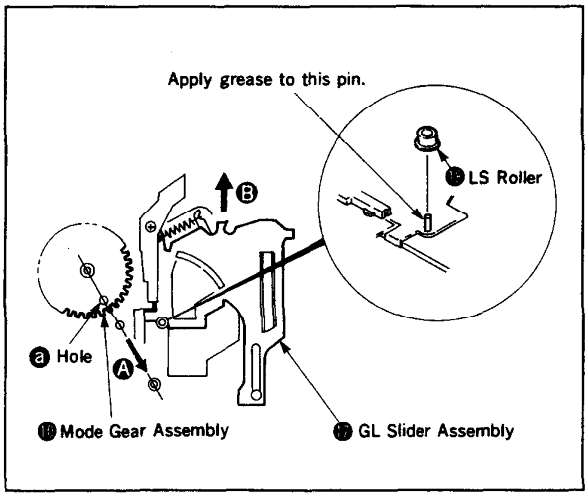

Apply grease to this pin.
⑱ LS Roller
Ⓑ
ⓐ Hole
Ⓐ
⑩ Mode Gear Assembly
⑰ GL Slider Assembly

Fig. 30

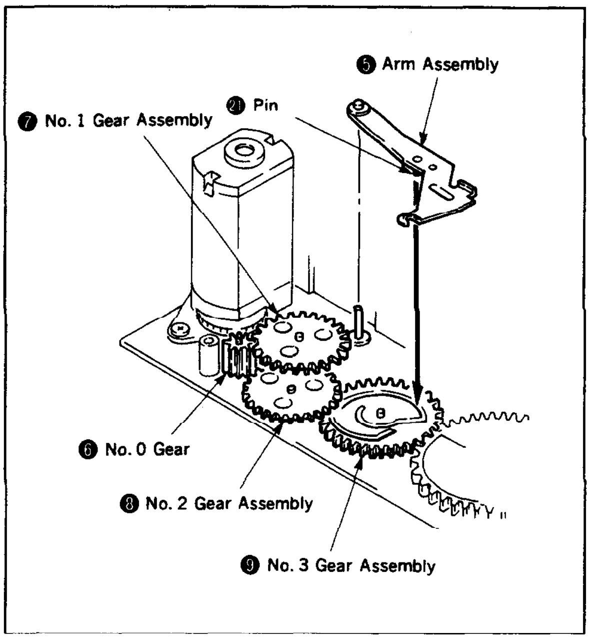

⑤ Arm Assembly
㉑ Pin
⑦ No. 1 Gear Assembly
⑥ No. 0 Gear
⑧ No. 2 Gear Assembly
⑨ No. 3 Gear Assembly

Fig. 34

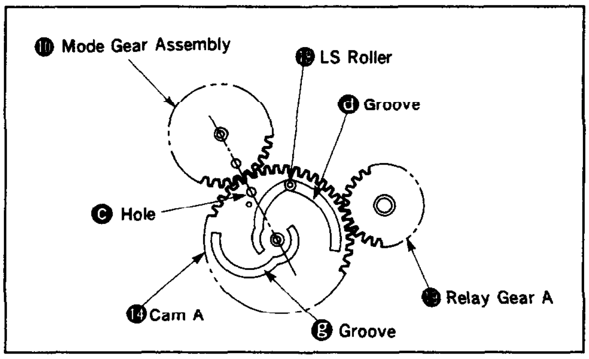

⑩ Mode Gear Assembly
⑱ LS Roller
ⓓ Groove
ⓒ Hole
⑲ Relay Gear A
⑭ Cam A
ⓖ Groove

Fig. 31

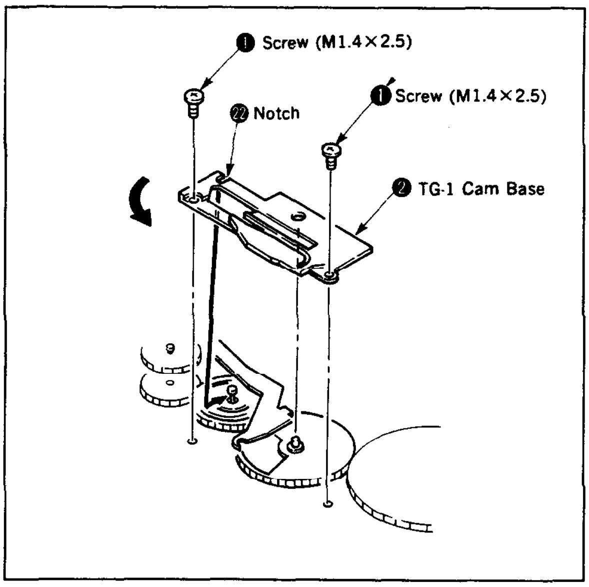

① Screw (M1.4×2.5)
① Screw (M1.4×2.5)
㉒ Notch
② TG-1 Cam Base

Fig. 35

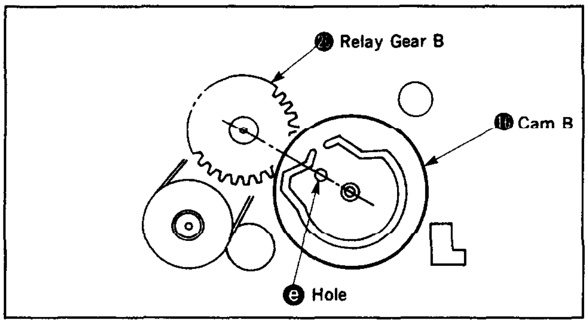

⑳ Relay Gear B
⑯ Cam B
ⓔ Hole

Fig. 32

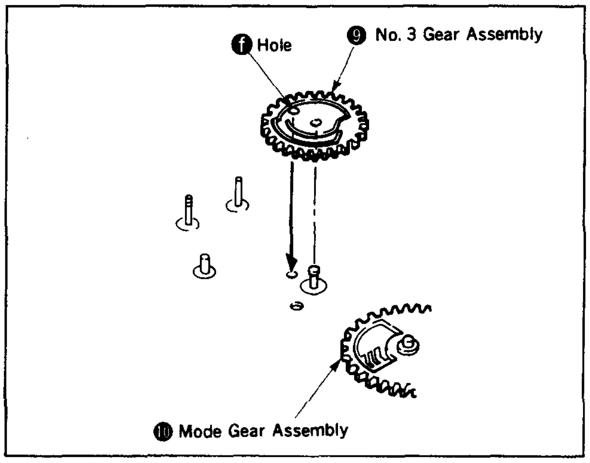

ⓕ Hole
⑨ No. 3 Gear Assembly
⑩ Mode Gear Assembly

Fig. 33

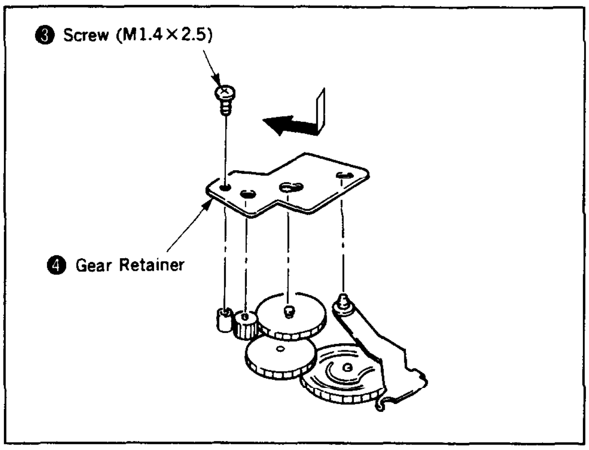

③ Screw (M1.4×2.5)
④ Gear Retainer

Fig. 36

3-16 GEAR TRAIN OPERATION CHECK (Fig. 37)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-7, remove the LS chassis.
3) Referring to 3-17, remove the loading motor.

2. Check

1) Insert the tip of tweezers into the hole a of the cam A ❶.
2) Rotate the cam A ❶ by about two thirds of a turn in a direction of the arrow Ⓐ, and then, in a direction of the arrow Ⓑ by the same amount. Repeat this 3 times.
3) When this is done, check that each, gear, the CL slider assembly and LS arm assembly rotate smoothly, and that no load is applied to them.
4) At the same time, check that the LS roller ❷ is located almost at the end point of the groove of the cam A ❶ when the gear train comes into contact with the stoppers at both ends.

Note : When rotating the cam A ❶ with the tip of tweezers, etc., be careful not to scratch the mechanical chassis.

3. Mounting

1) Referring to 3-17, mount the loading motor.
2) Referring to 3-7, mount the LS chassis assembly.
3) Referring to 1-1, mount the cassette compartment holder assembly.

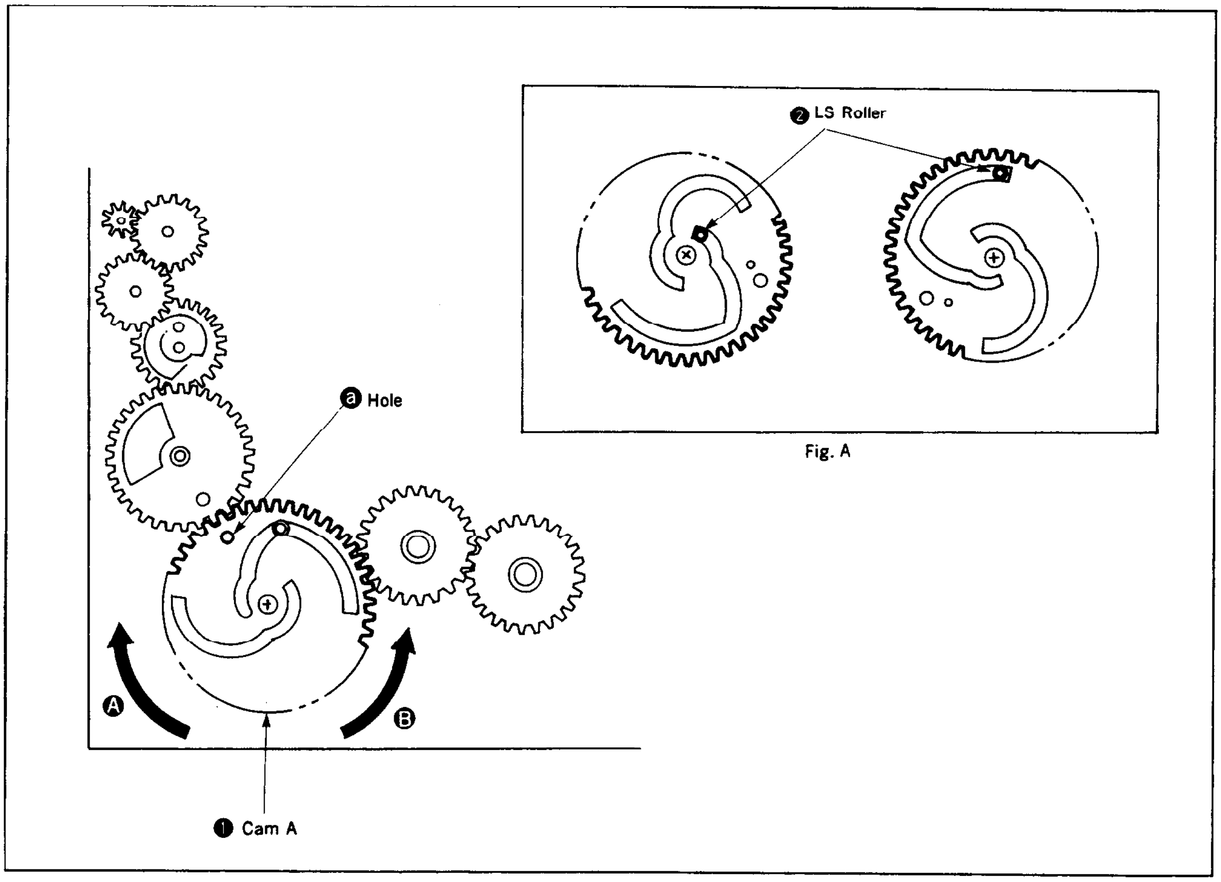


Fig. A

Fig. 37

3-17 LOADING MOTOR ASSEMBLY (Fig. 38)

1. Removal

1) Remove the LB-12 board.
2) Remove the connector ❶.
3) Remove the screws ❷ and ❸, and remove the loading motor assembly ❹ in an arrow direction.

2. Mounting

1) Put the pin ❺ of the loading motor assemmbly ❹ in the hole of the mechanical chassis, and mount it with the screws ❷ and ❸ in that order.
2) Mount the connector ❶.
3) Mount the LB-12 board.

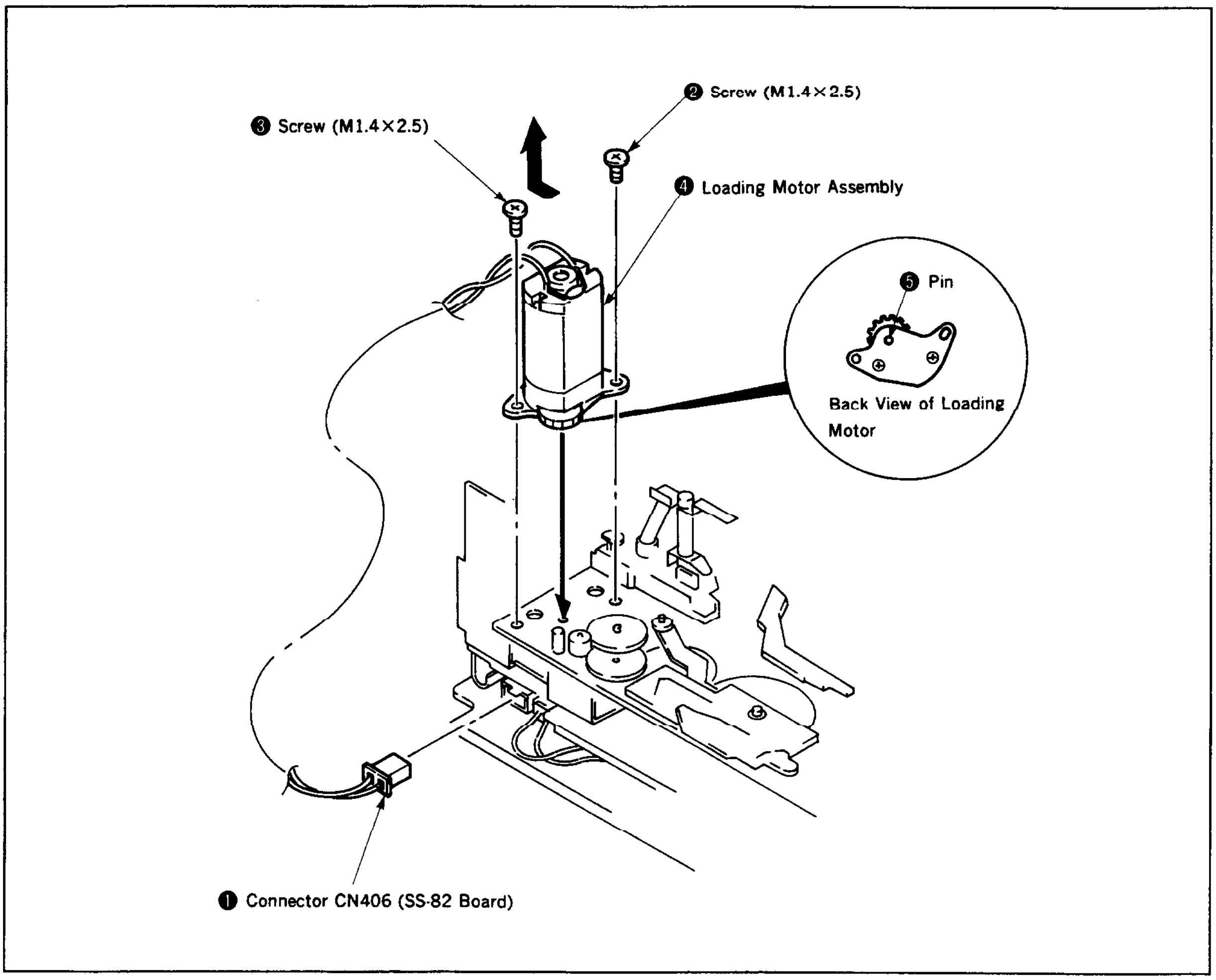

❷ Screw (M1.4×2.5)
❸ Screw (M1.4×2.5)
❹ Loading Motor Assembly
❺ Pin
Back View of Loading Motor
❶ Connector CN406 (SS-82 Board)

Fig. 38

3-18 GUIDE RAIL BASE 1 ASSEMBLY (Fig. 39)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Unskate the LS chassis a little.
3) Remove the two screws ●, and then, guide rail base 1 assembly ●.

Note : Be careful not to lose the spacers inserted in the parts ⓐ and ⓑ of the guide rail base 1 assembly ●. (Fig. B)

2. Mounting

1) Apply half a drip each of molyton grease at 2 places on the back of the guide rail base 1 assembly. (Fig. A)
2) Put the pin ● of the guide rail base 1 assembly ● in the notch of the chassis, and tighten the two screws ● with a torgue of 0.6kg•cm.
3) Referring to 1-1, mount the cassette compartment holder assembly.

Note1 : Mount paying attention to the number of spacers inserted and their locations.

Note2 : When tightening the screws, be careful not to bend the TG-2 upper flange ● with a screwdriver bit.

Note3 : Note that the part c of the guide rail base 1 assembly is easily broken. (Fig. B)

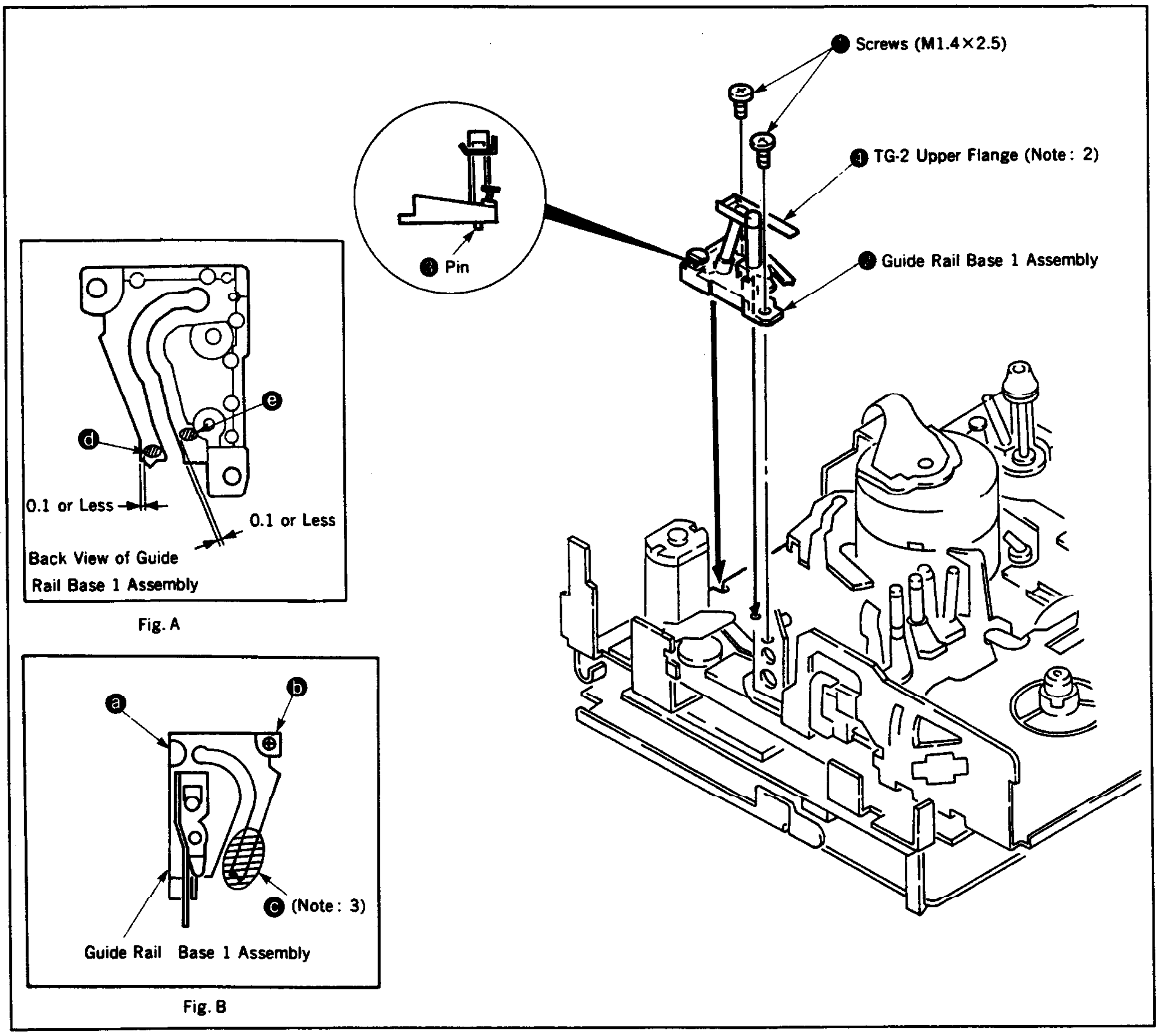

● Screws (M1.4×2.5)
● TG-2 Upper Flange (Note: 2)
● Guide Rail Base 1 Assembly
● Pin
ⓓ
ⓔ
0.1 or Less
0.1 or Less
Back View of Guide Rail Base 1 Assembly
ⓐ
ⓑ
ⓒ (Note: 3)
Guide Rail Base 1 Assembly

Fig. A

Fig. B

図39.

3-19 GUIDE RAIL BASE 2 ASSEMBLY (Fig. 40)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to the Service Manual, open the board in the back of the mechanical chassis.
3) Remove the four screws ❶, and then, frame B assembly ❷ in a direction of the arrowⒶ.
4) Unskate the LS chassis a little.
5) Remove the two screws ❸, and then, guide rail base 2 assembly ❹ in a direction of the arrowⒷ.

Note : Be careful not to hit the drum with a screwdriver bit because the screws are located closed to a drum lead.

2. Mounting

1) Apply half a drip of molyton grease each to 4 places on the back of the guide rail base 2 assembly. (Fig. A)
2) As shown in Fig. B, apply the striking parts of the guide rail base 2 assembly ❹ to the lower drum, and slide in an arrow direction to fit.
3) Pushing the part ✱ of the guide rail base 2 assembly ❹ lightly in a direction of ⓔ (Fig. B), tighten the two screws ❸ with a torque of 0.8kg•cm.

Note : Note that the part f is easily broken.

4) Mount the frame B assembly with the four screws ❶.
5) Mount the opened board to the back of mechanical chassis.
6) Referring to 1-1, mount the cassette compartment holder assembly.

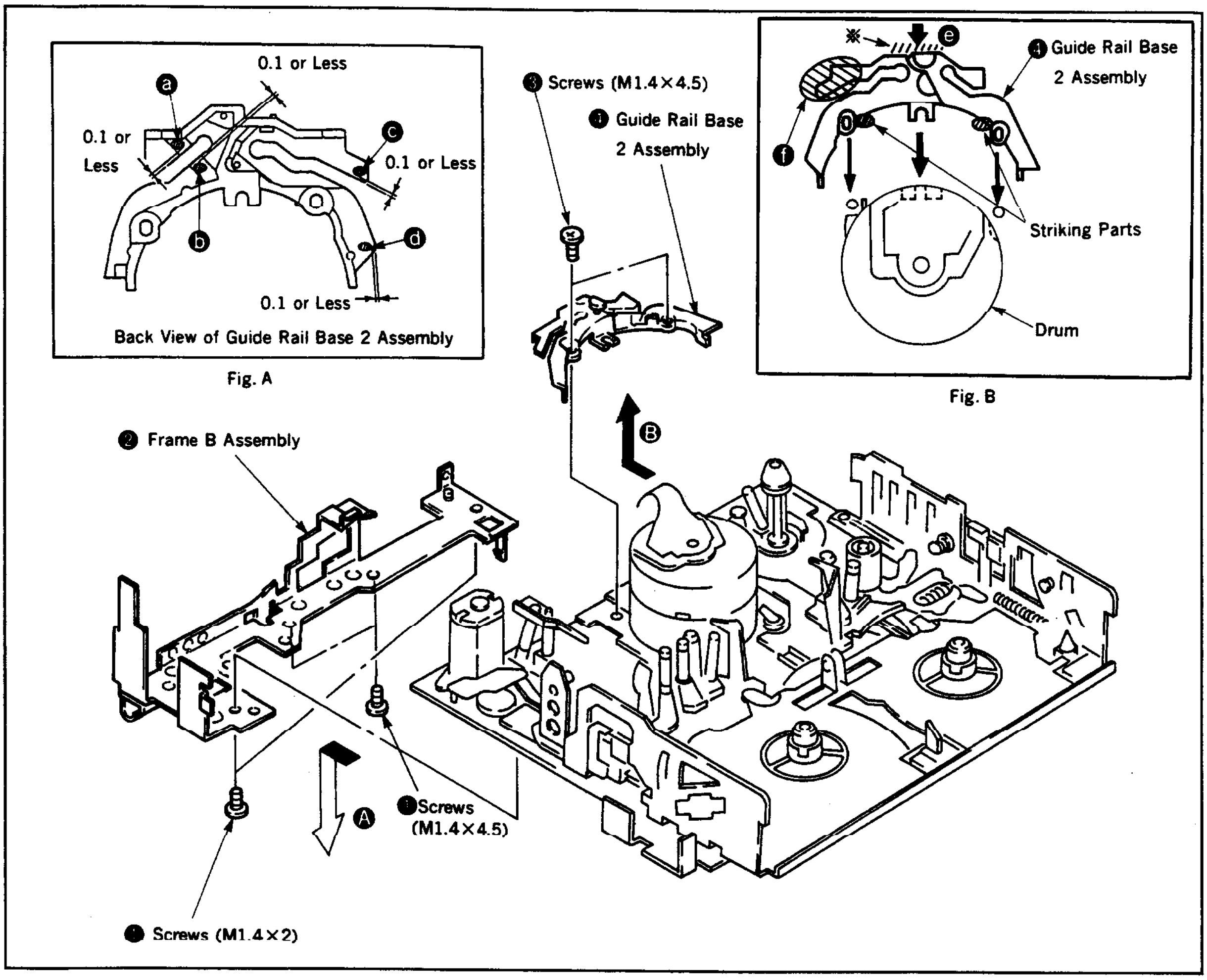

0.1 or Less
ⓐ
0.1 or Less
ⓒ
0.1 or Less
ⓑ
ⓓ
0.1 or Less
Back View of Guide Rail Base 2 Assembly
❸ Screws (M1.4×4.5)
❹ Guide Rail Base 2 Assembly
✱
ⓔ
❹ Guide Rail Base 2 Assembly
ⓕ
Striking Parts
Drum
Ⓑ
❷ Frame B Assembly
Ⓐ
❸ Screws (M1.4×4.5)
❶ Screws (M1.4×2)

Fig. A

Fig. B

Fig. 40

3-20 GUIDE RAIL BASE 3 ASSEMBLY (Fig. 41)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Remove the flexible rotatry shaft ●.
3) Remove the two screws ●. Remove the guide rail base 3 assembly ● in an arrow direction, seeing to it that it does not hitch on the capstan housing.

Note : Handle the ✱ marked part carefully because it is easily broken.

2. Mounting

1) Apply half a drip of molyton grease each to 2 places on the back of the guide rail base 3 assembly ●. (Fig. A)
2) Mount the guide rail base 3 assembly ●, seeing to it that it does not hitch on the capstan housing.
3) Tighten the two screws ● with a torque of 0.6kg•cm.
4) Mount the flexible rotary shaft ●.
5) Referring to 1-1, mount the cassette compartment holder assembly.

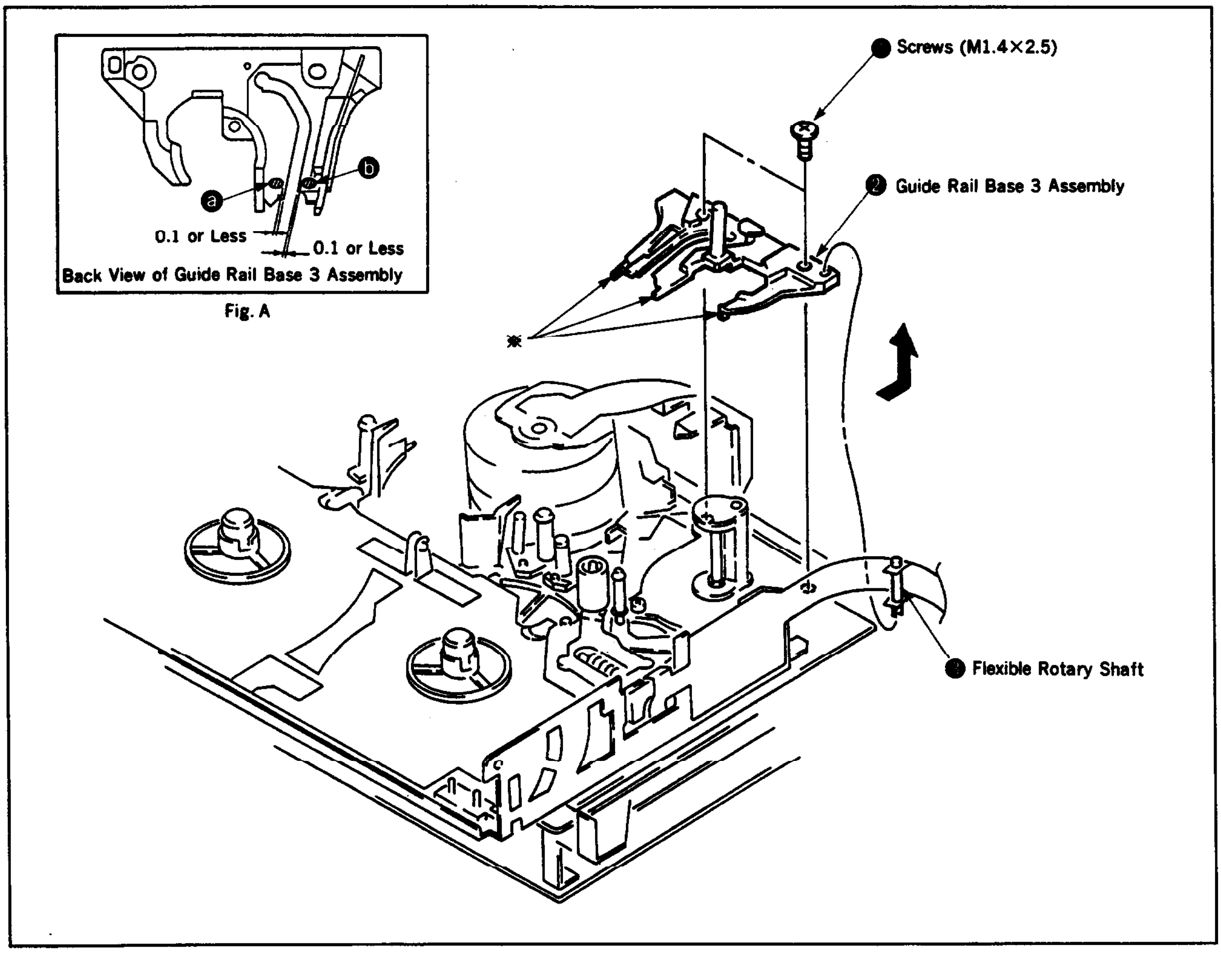

a
b
0.1 or Less
0.1 or Less
Back View of Guide Rail Base 3 Assembly
Fig. A
● Screws (M1.4×2.5)
❷ Guide Rail Base 3 Assembly
✱
● Flexible Rotary Shaft

Fig. 41

3-21 CAPSTAN MOTOR ASSEMBLY (Fig. 42)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-20, remove the guide rail base 3 assembly.
3) Remove the connector ● of the capstan motor assembly ●.
4) Remove the screw ●. Disengaging the gear of the conversion gear assembly ●, remove the capstan motor assembly ● in an arrow direction (obliquely).

2. Mounting

1) As shown in Fig. A, incline the capstan motor assembly ● to engage the gear of the capstan motor assembly ● with that of the conversion gear assembly ●, and tighten the screw 3 with a torque of 1kg•cm.
   When this is done, be careful not to damage the gear of the conversion gear assembly ●.
2) Mount the connector 2 to the capstan motor assembly ●.
3) Referring to 3-20, mount the guide rail base 3 assembly.
4) Referring to 1-1, mount the cassette compartment holder assembly.

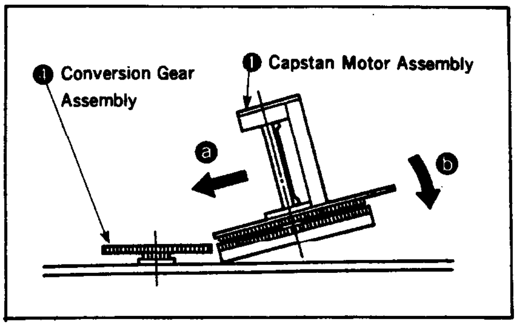

● Conversion Gear Assembly
● Capstan Motor Assembly
ⓐ
ⓑ

Fig. A

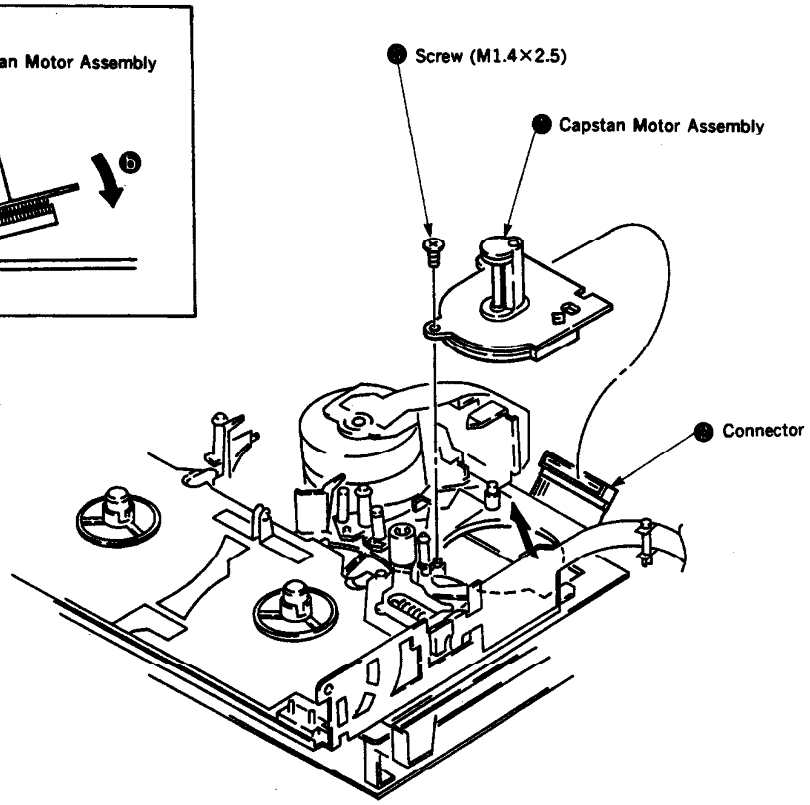

● Screw (M1.4×2.5)
● Capstan Motor Assembly
● Connector

Fig. 42

3-22 DRUM BASE ASSEMBLY (Fig. 42)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Remove the motor flexible board ● from the board.
3) Referring to 3-19, remove the guide rail base 2 assembly.
4) Remove the two screws ●.
5) Draw out the head flexible board ● carefully from the hole of the mechanical chassis not to damage it, and remove the drum base assembly.

2. Mounting

1) Put the head flexible board ● in the hole of the mechanical chassis and put the positioning pins ● of the drum base in the holes of the mechanical chassis.
2) Tighten the two screws ● with a torque of 0.8kg•cm.
3) Referring to 3-19, mount the guide rail base 2 assembly.
4) Mount the motor flexible board ● to the board.
5) Referring to 1-1, mount the cassette compartment holder assembly.

Note : After mounting, make tape path adjustment in Section 4.

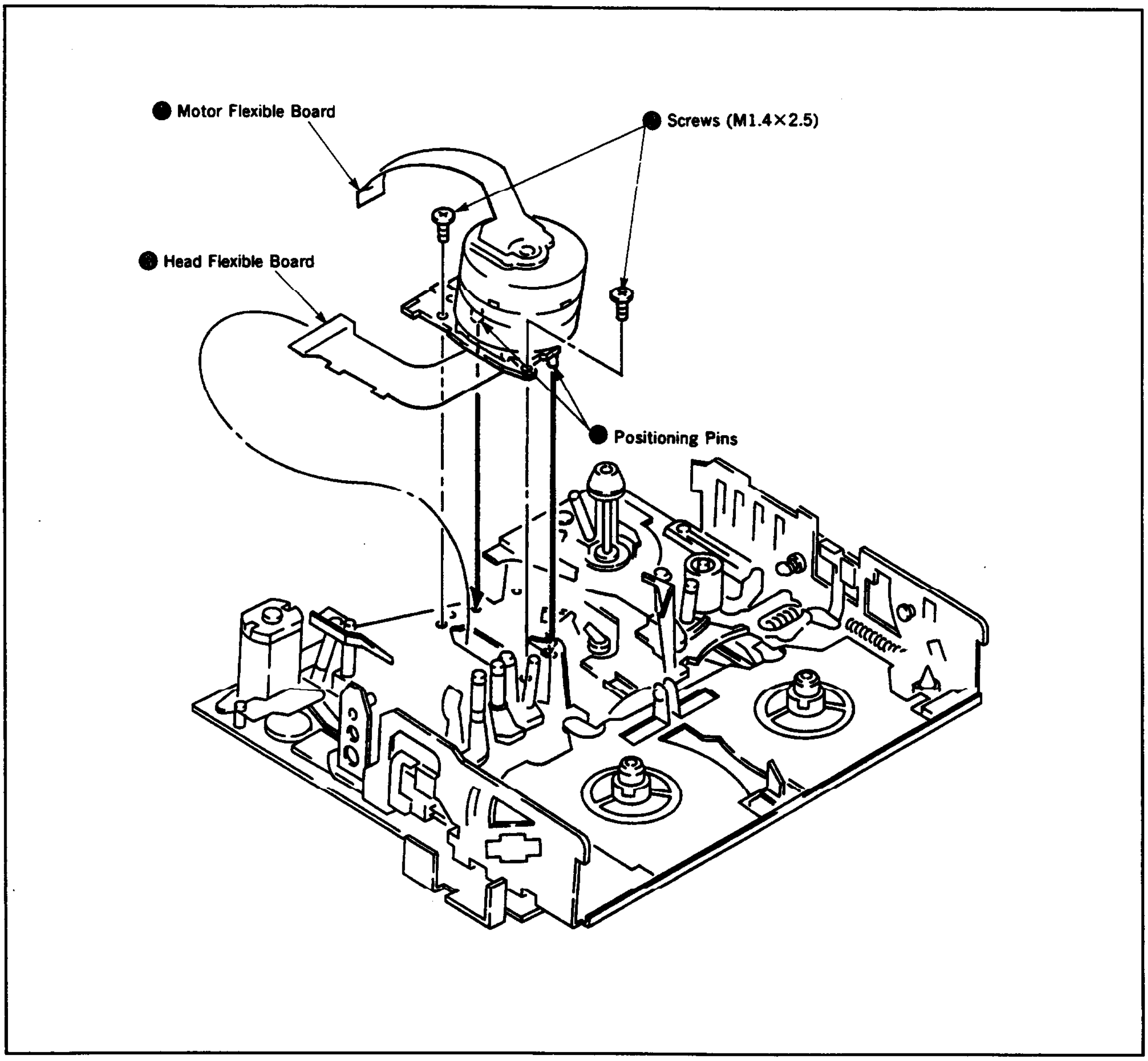


Fig. 42

3-23 DRUM ASSEMBLY (Fig. 43)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Remove the motor flexible board ❶ from the board.
3) Referring to 3-19, remove the guide rail base 2 assembly.
4) Remove the three screws ❷ from the back of the mechanical chassis.
5) Draw out the head flexible board ❸ carefully from the hole of the mechanical chassis not to damage it, and remove the drum assembly ❹.

2. Mounting

1) Put the head flexible board ❸ in the hole of the mechanical chassis, and mount it so that the pins ⓑ and ⓓ will be put in the holes ⓐ and ⓒ shown in Fig. A.
2) Tighten the three screws ❷ with a torque of 0.5kg•cm.
3) Referring to 3-19, mount the guide rail base 2 assembly.
4) Mount the motor flexible board ❶ to the board.
5) Referring to 1-1, mount the cassette compartment holder assembly.

Note : After mounting, make tape path adjustment in Section 4.

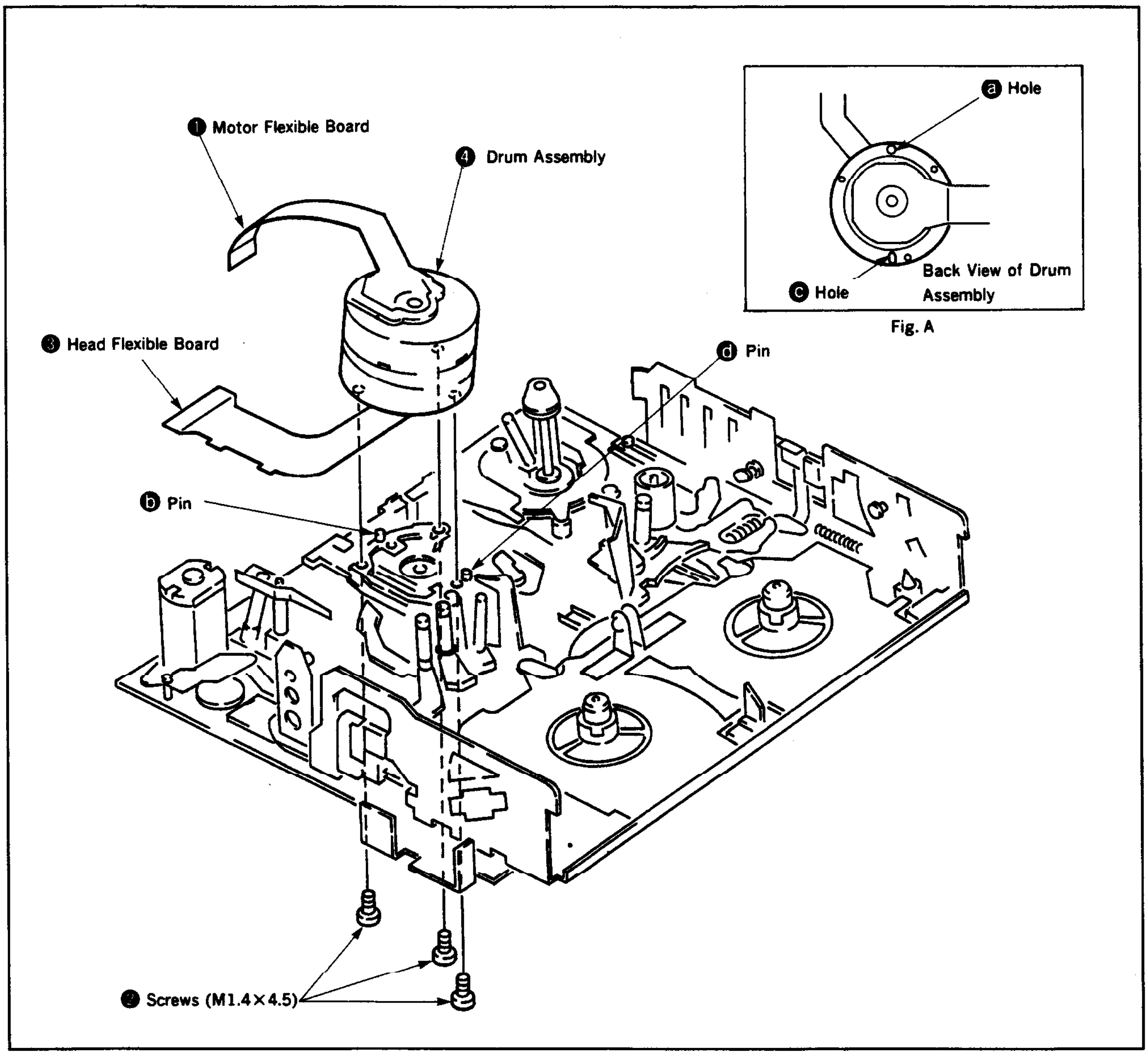
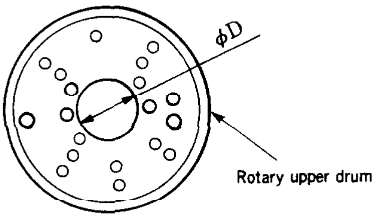

❶ Motor Flexible Board
❹ Drum Assembly
❸ Head Flexible Board
ⓑ Pin
ⓓ Pin
❷ Screws (M1.4×4.5)
ⓐ Hole
ⓒ Hole
Back View of Drum Assembly
Fig. A

Fig. 43

3-24 Replacement of Rotary Upper Drum Assembly

There are two rotary upper drum assembly types, depending on a color mark. (Fig. A in Fig. 45)



NTSC:

A-7049-190-A	Rotary upper drum assembly DGR-32-R-(1)
A-7049-189-A	Rotary upper drum assembly DGR-32-R-(2)

PAL:

A-7049-197-A	Rotary upper drum assembly DGR-37-R-(1)
A-7049-198-A	Rotary upper drum assembly DGR-37-R-(2)

Manufacturing upper dram

RANK	ϕD	MARK	
A	$\phi 8^{+0.0015}_{+0.001}$	Green	−01
B	$\phi 8^{+0.001}_{+0.0005}$	Green, Brown	
C	$\phi 8^{+0.0005}_{0}$	Black	
D	$\phi 8^{0}_{-0.0005}$	Black, Brown	
E	$\phi 8^{-0.0005}_{-0.001}$	Red	−11
F	$\phi 8^{-0.001}_{-0.0015}$	Red, Brown	
G	$\phi 8^{-0.0015}_{-0.002}$	Blue	
H	$\phi 8^{-0.002}_{-0.0025}$	Blue, Brown	

Repairing upper drum

SUFFIX	ϕD	REMARKS	DRUM UPPER
−01	$\phi 8^{+0.001}_{+0.0005}$	Green, Brown	NTSC DGR-32-R-(1) PAL DGR-37-R-(1)
	$\phi 8^{+0.0005}_{0}$	Black	
−11	$\phi 8^{-0.001}_{-0.0015}$	Red, Brown	NTSC DGR-32-R-(2) PAL DGR-37-R-(2)
	$\phi 8^{-0.0015}_{-0.002}$	Blue	

1. Removal

1) Referring to 3-23, remove the drum assembly.
2) Remove the two screws ❶. (Fig. 44)
3) Hold the outlet (base) of the guide protector ❷, lift it up obliquely. In that state, hold the outer figure of the back yoke ❸ and remove it. (Fig. 44)

Note : Note that the flexible board and guide protector ❷ easily come off position because they are only pasted.

4) As shown in Fig. A, set the rotor earth spring ❹ around spring hook. (Fig. 44)
5) Using a drum screwdriver (Ref. No. J-11), remove the two hexagon socket bolts ❺, and then, rotary upper drum assembly ❻. (Fig. 45)
6) Using the drum screwdriver (Ref. No. J-11), remove the two hexagon socket bolts ❼, and then, rotor ❽. (Fig. A in Fig. 45)

2. Mounting

1) Clean the flange surface❿and the surface of the rotary upper drum assembly ❻ which comes into contact with it, and make sure that there is no dust or scratch. (Fig. 45)
2) Adjust a direction of the upper drum so that the head contact mold pin⓫will be put in the reference hole of the rotary upper drum assembly ❻, and push it in lightly. (Fig. 45)

Note : Check visually that the clearance between the upper and lower drums is about 0.05mm.

3) Using the drum screwdriver (Ref. No. J-11), tighten the two hexagon socket bolts ❺ (800g·cm) and rotate it with finger to make sure that there is no abnormality. (Fig. 45)
4) Put the pin ❾ of the rotor ❽ in the hole of the rotary upper drum assembly. Using the drum screwdriver (Ref. No. J-11), tighten the hexagon socket bolts ❼. (800g·cm) (Fig. A in Fig. 45)
5) Remove the rotor earth spring ❹ from the spring hook. Using tweezers, etc., hook it onto the groove of the stator boss⓬. (Fig. B in Fig. 45)

Note : See to it that the rotor earth spring ❹ is not located in the gap between the flange and stator.

6) Hold the outer figure of the back yoke ❸, put it on the inner step of the upper drum and insert the other side slowly. (Fig. B in Fig. 44)
7) Tighten the two screws ❶. (500g·cm) (Fig. 44)
8) Rotate the upper drum with finger to check that it runs smoothly.
9) Referring to 3-23, mount the drum assembly.

Note : After mounting, be sure to make tape path adjustment in Section 4.

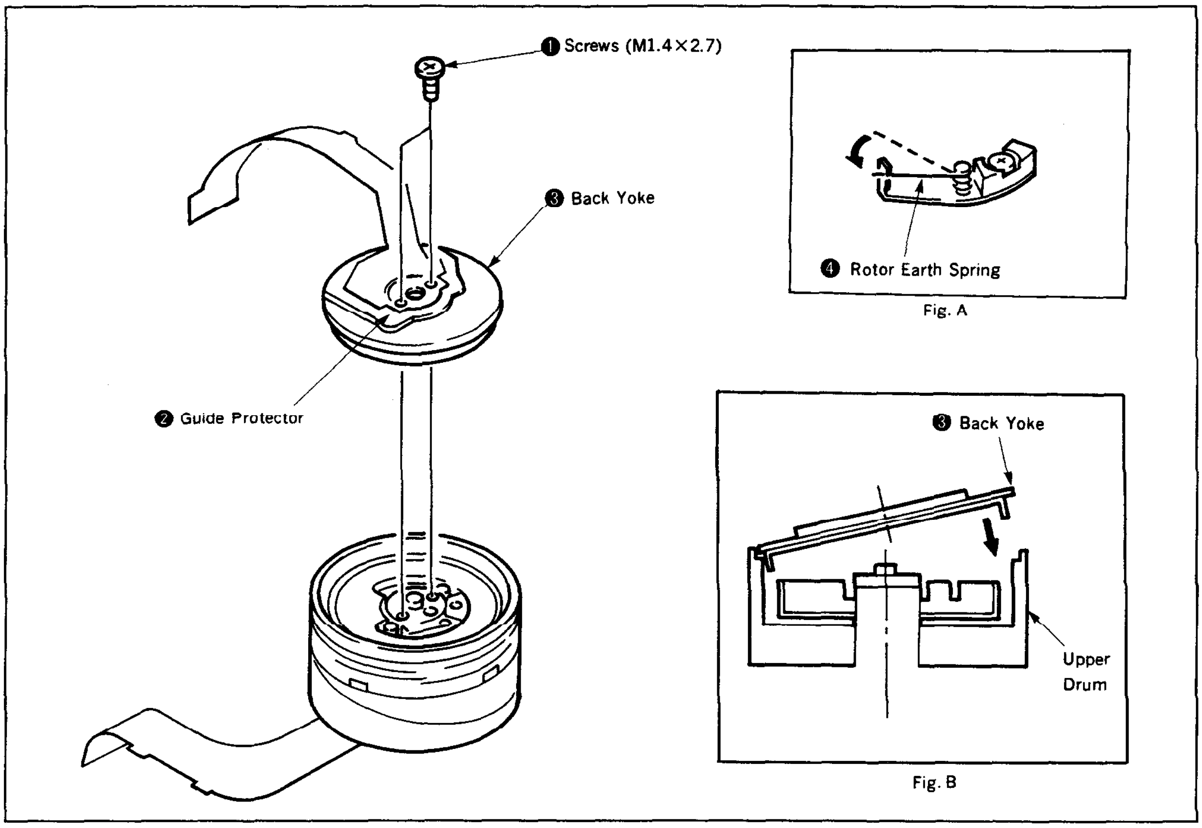

❶ Screws (M1.4×2.7)
❸ Back Yoke
❷ Guide Protector
❹ Rotor Earth Spring
Fig. A
❸ Back Yoke
Upper Drum
Fig. B

Fig. 44

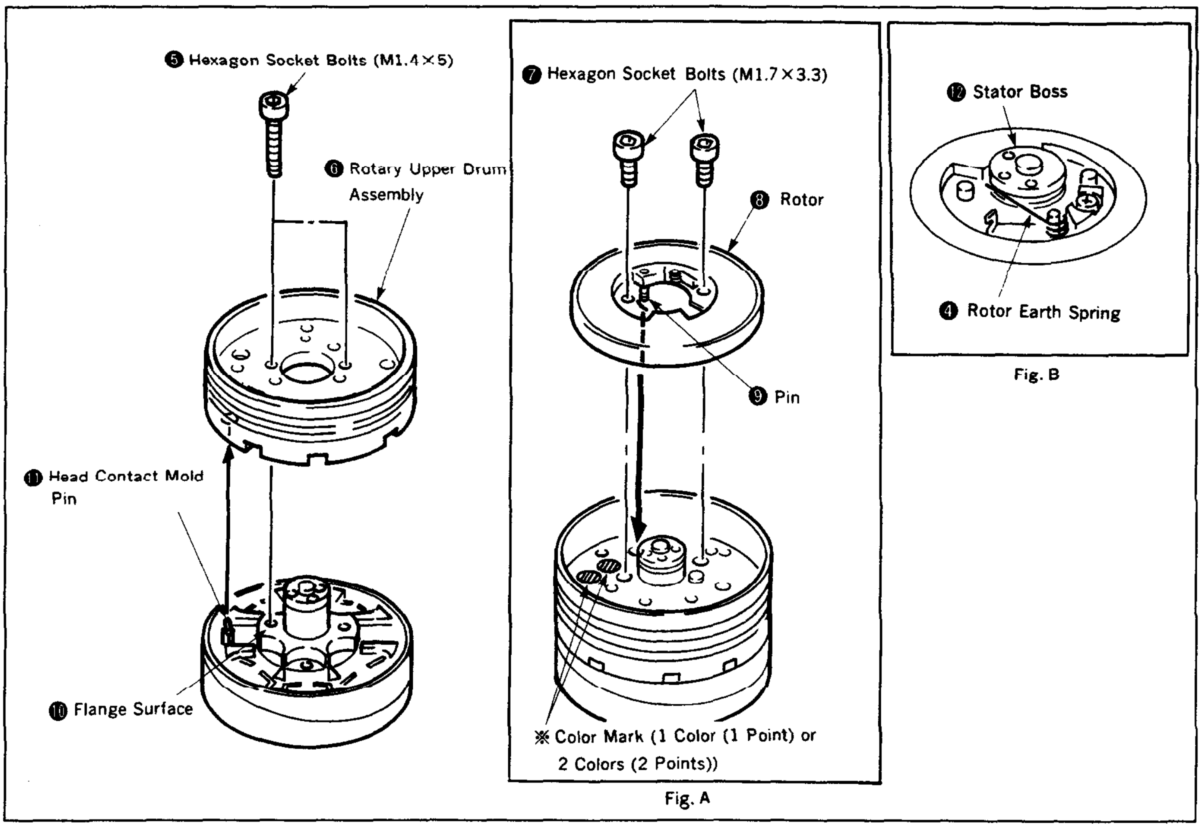

❺ Hexagon Socket Bolts (M1.4×5)
❻ Rotary Upper Drum Assembly
⓫ Head Contact Mold Pin
❿ Flange Surface
❼ Hexagon Socket Bolts (M1.7×3.3)
❽ Rotor
❾ Pin
※ Color Mark (1 Color (1 Point) or 2 Colors (2 Points))
Fig. A
⓬ Stator Boss
❹ Rotor Earth Spring
Fig. B

Fig. 45

3-25 REEL TABLE HEIGHT CHECK (Fig. 46)

1. Removal

1) Referring to 1-1, remove the cassette compartment holder assembly.
2) Referring to 3-1, remove the LED base.

2. Check

1) Using slide calipers, etc., check that distances from the LS chassis to the S reel table reel resting surface ❷ and T reel table reel resting surface ❸ are respectively as shown in below.

3. Mounting

1) Referring to 3-1, mount the LED base.
2) Referring to 1-1, mount the cassette compartment holder assembly.

A: $3.2^{+0.2}_{-0.15}$ mm

B: 3.2 ± 0.15mm

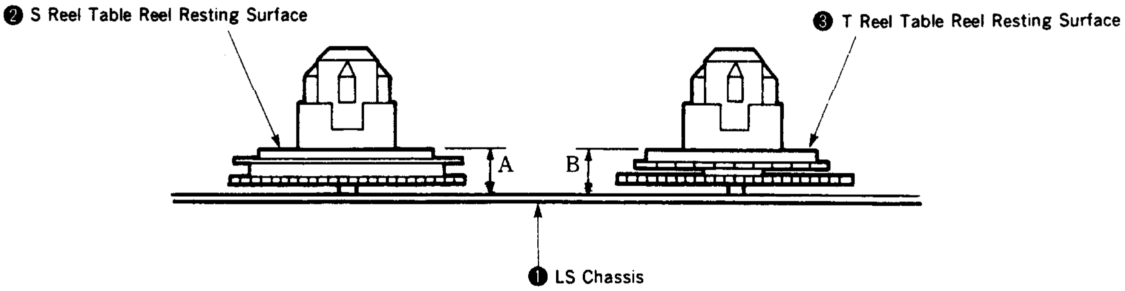

❷ S Reel Table Reel Resting Surface
❸ T Reel Table Reel Resting Surface
A
B
❶ LS Chassis

Fig. 46

3-26 FWD/RVS TORQUE CHECK

1) Set the FWD/RVS take-up torque cassette (Ref. No. J-10).
2) In the FWD mode, check that a T reel torque value is 5 – 15g·cm.
3) Turn on the REC/REVIEW button and check that an S reel torque value is 25g·cm – 45g·cm.
4) When the values above are not met, replace the respective reel tables.

3-27 TENSION REGULATOR POSITION ADJUSTMENT

1. Removal

1) Referring to 1-1, remove the cassette compartment holder.

2. Adjustment

1) Set a cassette tape, select the REC mode and run the tape. (Refer to 1-3)
2) With the tape running, check that the distance between TG-1 and TG-2 is 9.35 – 10.7mm. (Fig. 47)
3) When they are not at specified positions, remove the cassette and go through the steps 4) on.
4) Referring to 3-1, remove the LED base.
5) Loosen the screw ❶.
6) When TG-1 is located inside (or outside) its specified position, shift the TG-1 adjustment block 2 slightly in a direction of the arrow Ⓐ (or Ⓑ) and fix with the screw ❶. (Fig. 48)
7) Referring to 3-1, mount the LED base.

Note: Use the cassette tape after feeding the tape as far as a middle point.

When taking the steps 4) and 5), remove the cassette tape first.

Check that TG1 is able to move in direction C during REC.

3. Mounting

1) Referring to 1-1, mount the cassette compartment holder assembly.

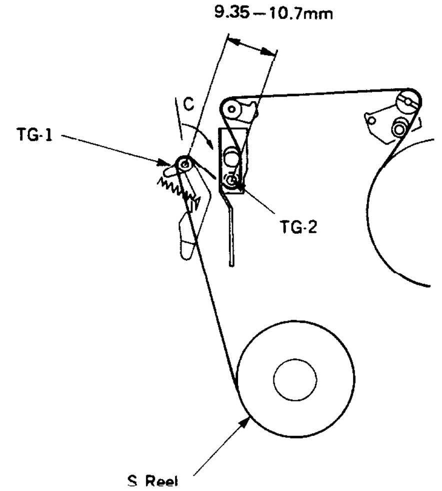


Fig. 47

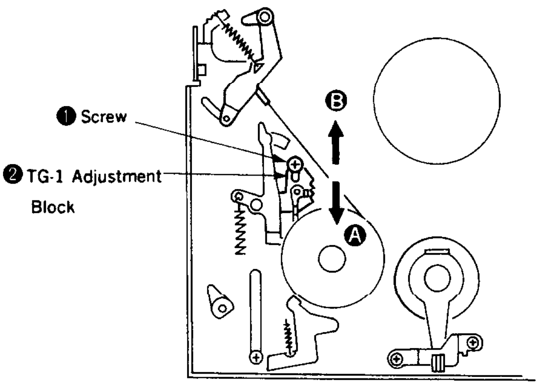


Fig. 48

3-28 FWD BACK TENSION ADJUSTMENT (Fig. 49)

1. Removal

1) Referring to 1-1, remove the cassette compartment assembly.
2) Referring to 3-7, remove the LED base.

2. Adjustment

1) Select the REC mode.
2) Set the tension measurement reel (Ref. No. J-8)●.
3) Using the dial tension gauge (Ref. No. J-7)●, measure a tape tension at the outlet of TG-2. When this is done, pull the tape at a rate of 14mm/sec.
4) Change the position of the tention regulator spring ● position as shown in Fig. A so that measure center value of the tention is 4 – 6.5g.

Note : When this is done, see to it that the gear ● is not engaged with the S reel table.

3. Mounting

1) Referring to 1-1, mount the cassette compartment holder assembly.
2) Referring to 3-1, mount the LED base.

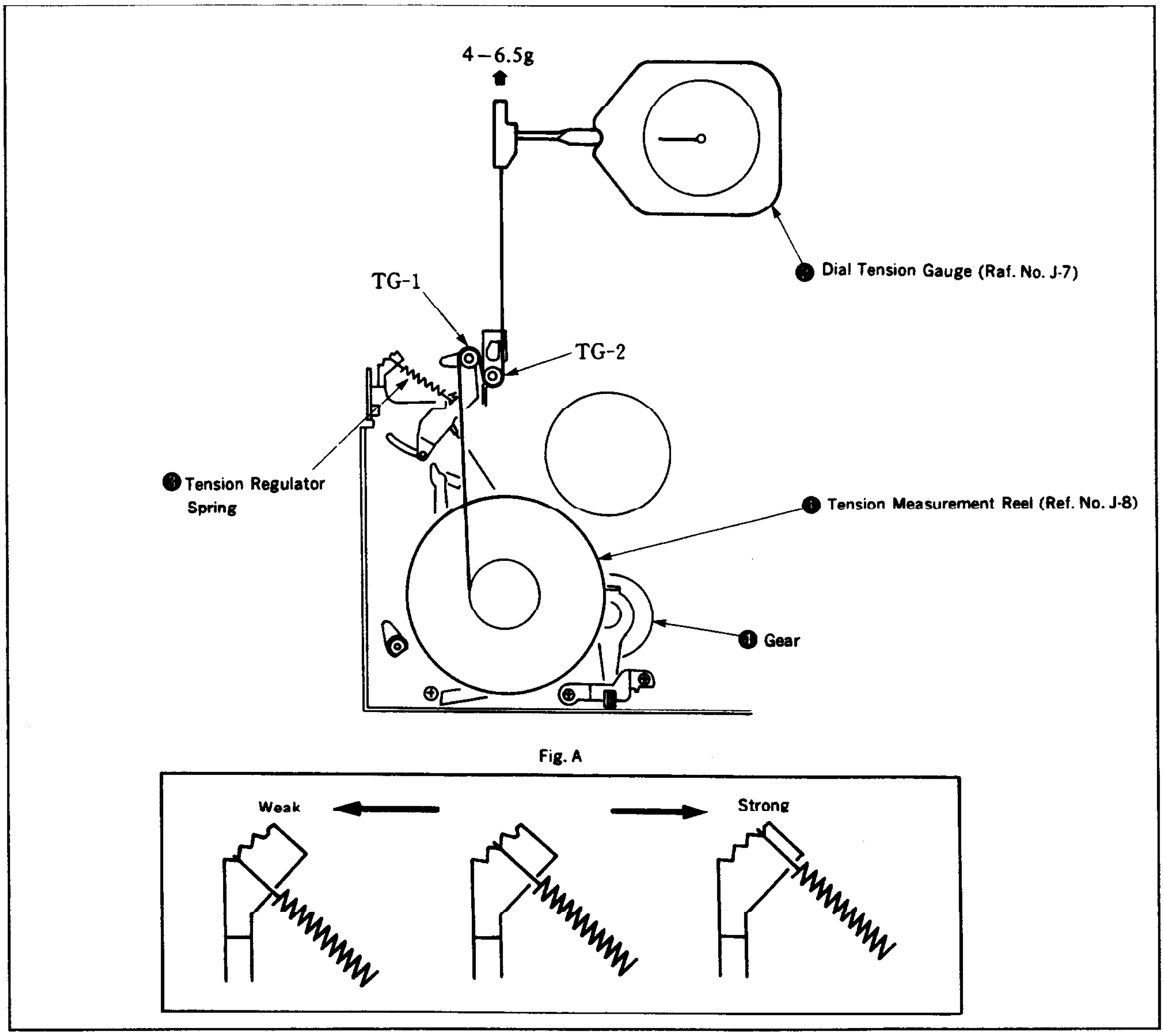

4 – 6.5g
● Dial Tension Gauge (Raf. No. J-7)
TG-1
TG-2
● Tension Regulator Spring
● Tension Measurement Reel (Ref. No. J-8)
● Gear
Fig. A
Weak
Strong

Fig. 49

4. TAPE PATH ADJUSTMENT

The 8mm video system uses ATF (Automatic Track Finding) which instantaneously controls a tape running speed based on 4 types of pilot signals and performs high-precision tracking.

This does away a tracking control knob and allows accurate track tracing.

On the other hand, however, the ATF system has a problem in adjusting the tape path system. That is, if head tracing is out of order a little, the ATF system automatically corrects it, which means that perfect adjustment cannot be done.

To avoid this problem, a track shift jig had been used to adjust the tape path system. In the FL (Q) mechanism, the ATF system is forcibly operated to shift a tracking amount constantly (approx. 1/4) by setting the PATH mode. So, fine tracking adjustment can be easily done.

No track shift jig is required any more.

Example) For CCD-V11/V88

CN404

4	GND
3	$\overline{\text{CAM ADJ}}$
2	$\overline{\text{TEST}}$
1	$\overline{\text{PATH}}$

The path mode is set by shorting the pins ① and ④.

4-1 PREPARATION FOR ADJUSTMENT

1) Clean the tape running surfaces (tape guides, drum, capstan shaft, pinch roller). (Fig. 51)
2) Set the PATH mode by shorting the TEST pins (CN404 pins ① and ④ for CCD-V11/V88).
3) Connect to an oscilloscope.
4) Play back a tracking alignment tape (NTSC: WR5-1N), (PAL: WR5-1C).
5) Check that a RF waveform is flat at the inlet and outlet of the oscilloscope. (Fig. 50 ⓐ)

   When it is not flat, make adjustment in accordance with the procedures below.

   When the RF waveform is not flat at the inlet/outlet; (Fig.50 ⓑ and ⓒ)

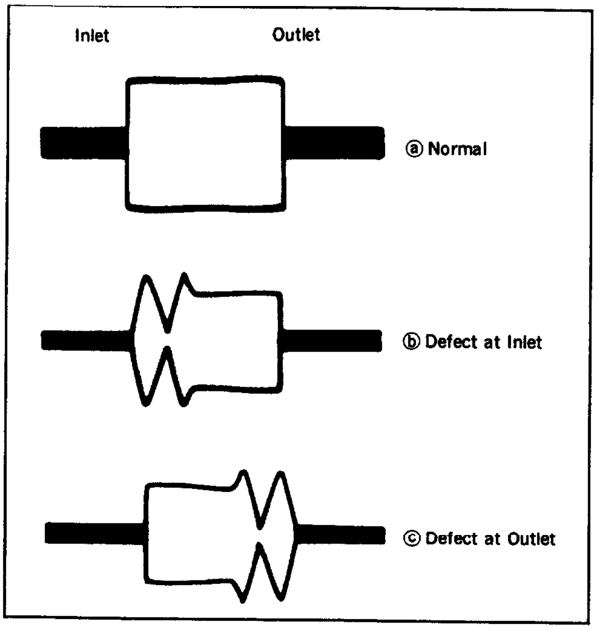

Inlet
Outlet
ⓐ Normal
ⓑ Defect at Inlet
ⓒ Defect at Outlet

Fig. 50

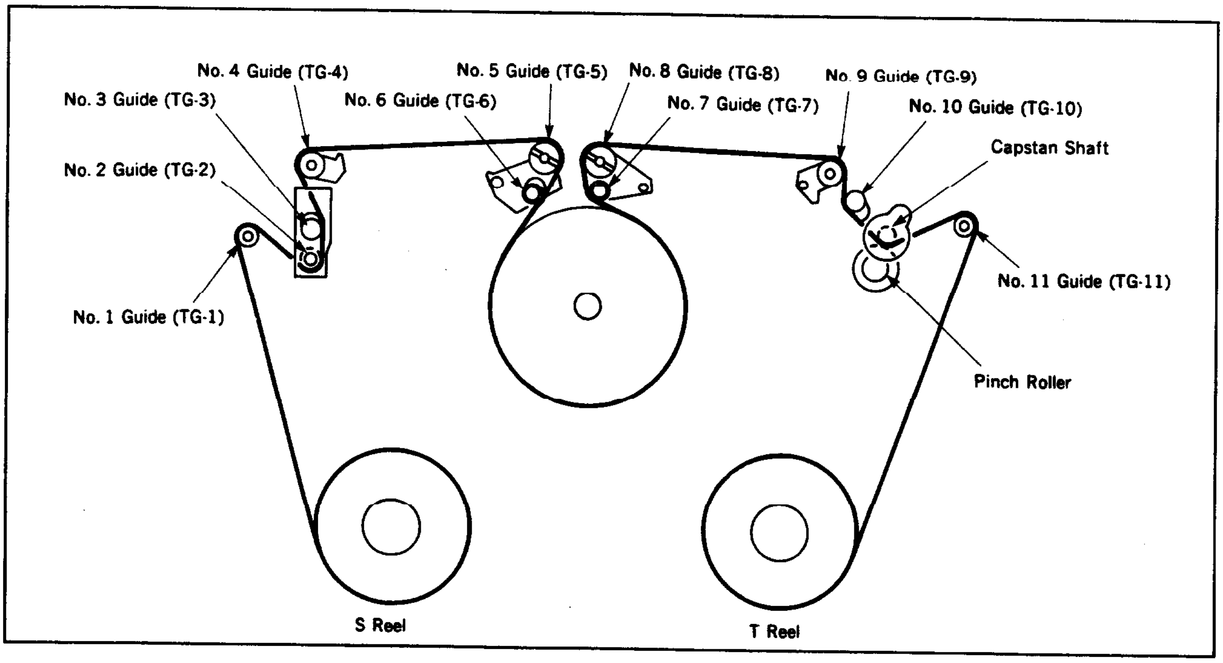

No. 4 Guide (TG-4)
No. 5 Guide (TG-5)
No. 8 Guide (TG-8)
No. 9 Guide (TG-9)
No. 3 Guide (TG-3)
No. 6 Guide (TG-6)
No. 7 Guide (TG-7)
No. 10 Guide (TG-10)
Capstan Shaft
No. 2 Guide (TG-2)
No. 11 Guide (TG-11)
No. 1 Guide (TG-1)
Pinch Roller
S Reel
T Reel

Fig. 51 Tape Guides Location

4-2 TRACKING ADJUSTMENT (Fig. 52)

1) Play back the tracking alignment tape.
2) Loosen the No. 5 guide (TG-5) lock screw ❶ and turn the No. 5 guide to flatten the waveform at the inlet.
3) Tighten the No. 5 guide (TG-5) lock screw ❶ to lock the No. 5 guide.
4) Loosen the No. 8 guide (TG-8) lock screw ❷ and turn the No. 8 guide to flatten the waveform at the outlet.
5) Tighten the No. 8 guide (TG-8) lock screw ❷ to lock the No. 8 guide. When this is done, make sure that the waveform does not change at the outlet.

Note : Be careful not to loosen the lock screw too much because the guide is easily moved.

Tape path Adjustment for "Guide Rail Base 2 with TG8 Gate Adjustment"

You do not have to adjust theTG-8 gate adjustment screw.

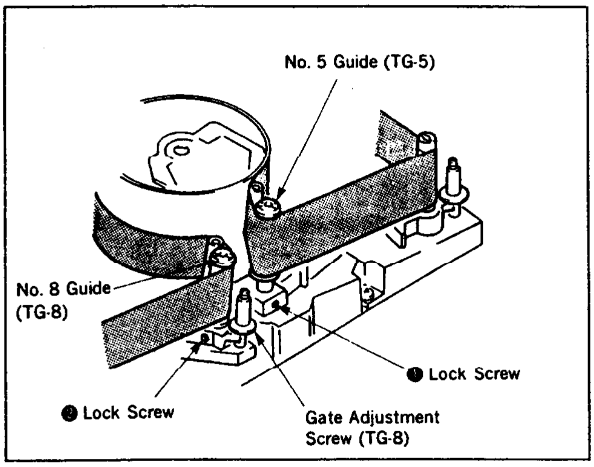


Fig. 52

4-3 NO. 4 GUIDE (TG-4) ADJUSTMENT

When an entire guide base is replaced, its height has been preste.

TG-4 Guide Height Presetting

1) With the top surface of the TG-4 guide leveled, rotate an upper flange by one turn. This is a preset height.

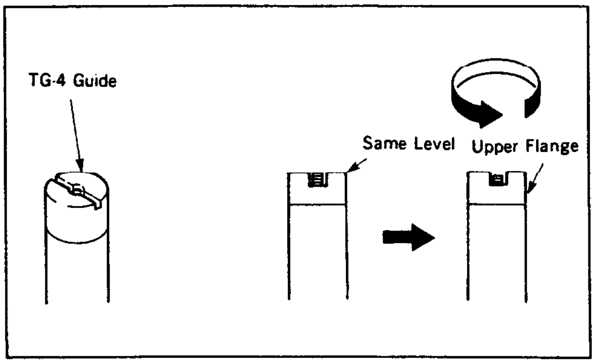


Fig. 53

No. 4 Guide (TG-4) Adjustment

1) Play back the tracking alignment tape.
2) In the FWD mode, check that the tape runs along a TG-4 lower flange. When there is a clearance, turn TG-4 counter-clockwise to put the tape along the TG-4 lower flange. turning angle must be within 180°.
   When this is done, check that a tracking waveform (Fig. 54) is not changed.
   When a tracking waveform inlet is downward as shown in Fig. 55, make tracking adjustment at the inlet side by raising a height of TG-4.

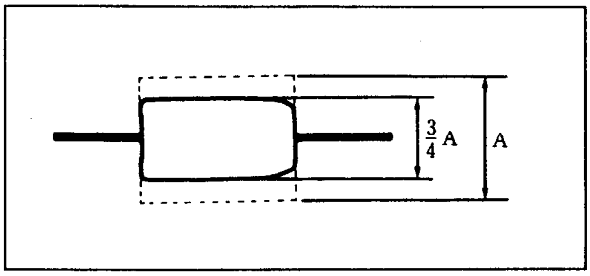


Fig. 54

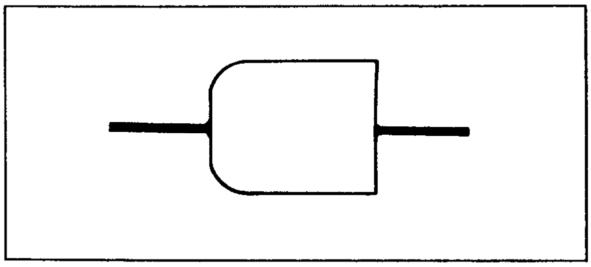


Fig. 55

Tape Path Adjustment for "Guide Rail Base 1 with TG4 Gate Adjustment" (Fig. 56)

After adjusting an inlet, when the TG-4 lower flange is curled in the REV mode, turn the TG-4 gate adjusting screw at pitches of 45° to the left to remove a curl. (A lock screw is attached to the TG-4 gate adjusting screw. First, loosen the lock screw a little, and then, turn the gate adjusting screw. After adjustment, tighten the lock screw.)

If the TG-4 gate adjusting screw is turned to the left too much, the TG-2 upper flange (arrow-indicated part in the figure above) is greatly curled. If it happens, turn the screw to the right.

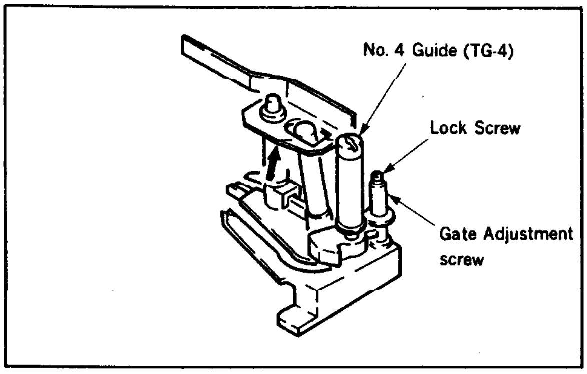


Fig. 56

4-4 NO. 11 GUIDE (TG-11) ADJUSTMENT

1) In the PLAY BACK mode, check that it has no deflection between the capstan and No. 11 guide (TG-11).
   (Criterion : 0.5mm or less)
   when the tape is deflected, turn the No. 11 guide (TG-11) to remove its deflection. (Fig. 57)
2) Select the REV mode and check the RF waveform at the outlet side. (Fig. 58)
3) If the waveform is defective, turn the TG-11 nut counterclockwise by 90° and recheck 2), 3) and 4).
4) Apply screw lock to the No. 11 guide (TG-11).

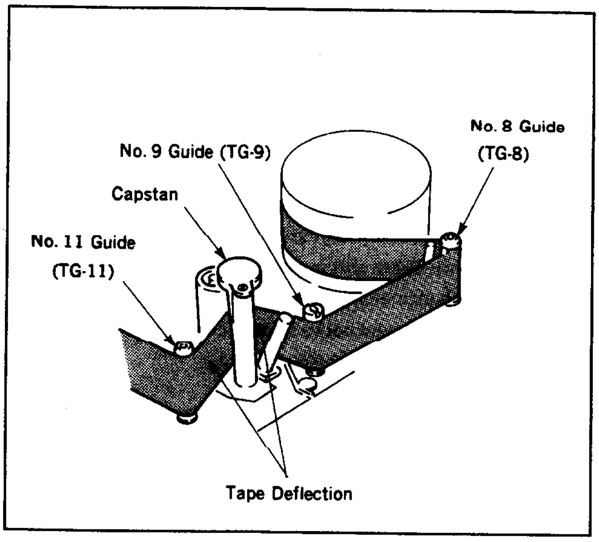

No. 8 Guide
(TG-8)
No. 9 Guide (TG-9)
Capstan
No. 11 Guide
(TG-11)
Tape Deflection

Fig. 57

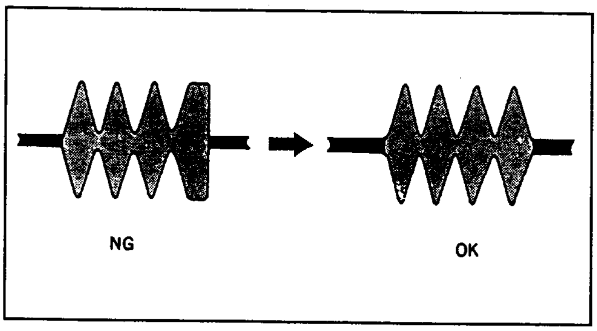


Fig. 58

4-5 CHECK AFTER ADJUSTMENT

1. Tracking Check

1) Play back the tracking alignment tape. In the PATH mode, shift a track. (Fig. 59)
2) At this time, check that a minimum amplitude value (E_{MIN}) is 67% or more of a maximum amplitude value (E_{MAX}). (Fig. 60)
3) Make sure that the waveform does not fluctuate greatly. (Fig. 61)

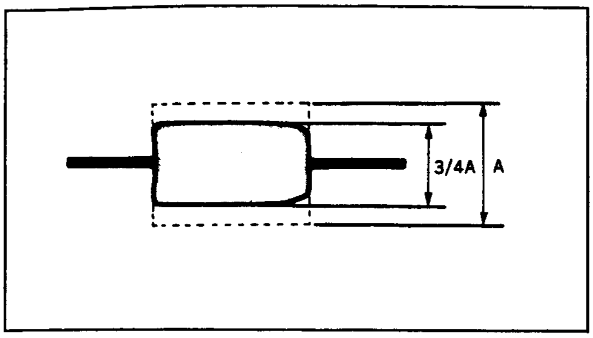


Fig. 59

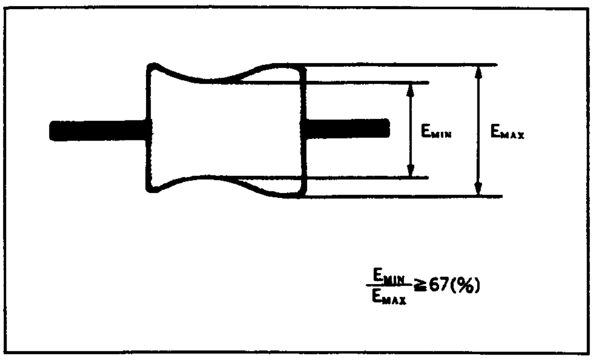


Fig. 60

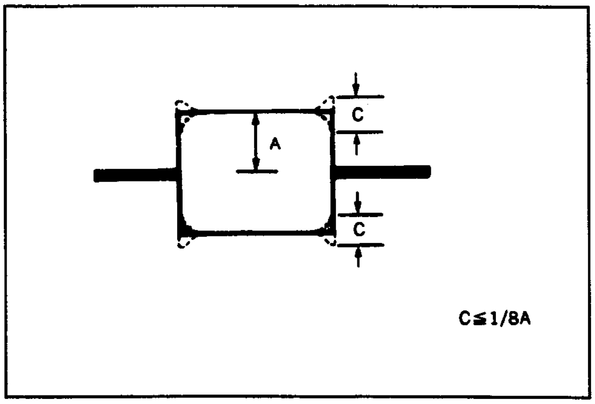


Fig. 61

2. CUE, REV Check

1) Play back the tracking alignment tape and select the $\boxed{\text{REV}}$ mode. At this time, waveform peak pitches must be unform. (Fig. 62 ⓐ) When they not uniform, make tracking adjustment in 4-2 and No. 11 guide (TG-11) adjustment in 4-4.
2) Select the $\boxed{\text{CUE}}$ mode. At this time waveform peak pitches must be uniform. (Fig. 62 ⓑ) When not uniform, make tracking adjustment in 4-2.

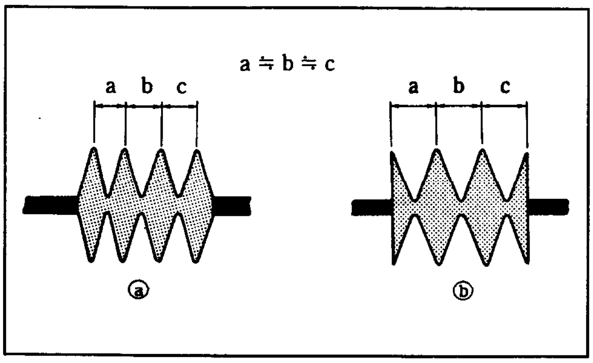


Fig. 62

3. Rise Check

1) Play back the tracking alignment tape.
2) In the PLAY BACK mode, check that the RF waveform rises horizontally within one second. At this time, check also that the tape is not deflected around the pinch roller. (Fig. 63)
3) Play back the tape after CUE/REV and FF/REW operation and check that the RF waveform rises horizontally within one second. At thistime, check also that the tape is not deflected around the pinch roller.
4) Repeat the checks in 2) and 3).

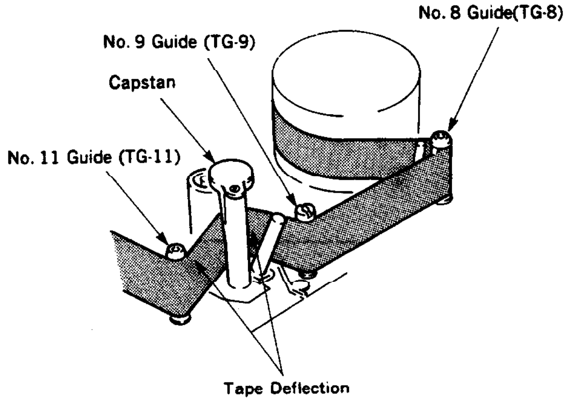

No. 8 Guide(TG-8)
No. 9 Guide (TG-9)
Capstan
No. 11 Guide (TG-11)
Tape Deflection

Fig. 63

4. Tape Running Check

In the CUE and REV modes, check that the TG-2 upper and lower flanges, TG-4 lower flange, TG-5 upper flange, TG-8 upper flange and TG-11 upper and lower flanges are not culed greatly. (Fig. 63)

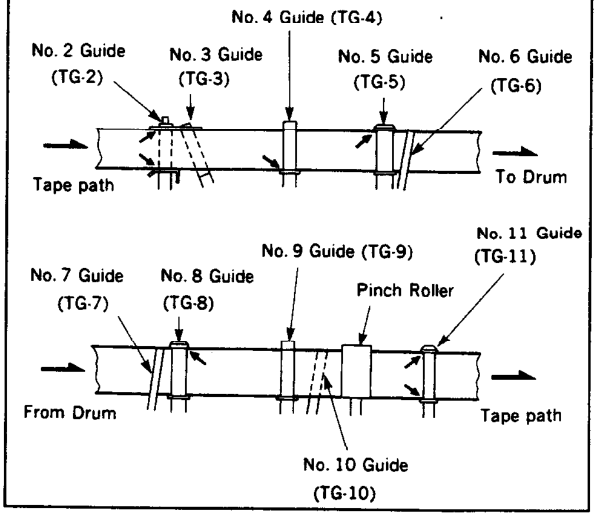
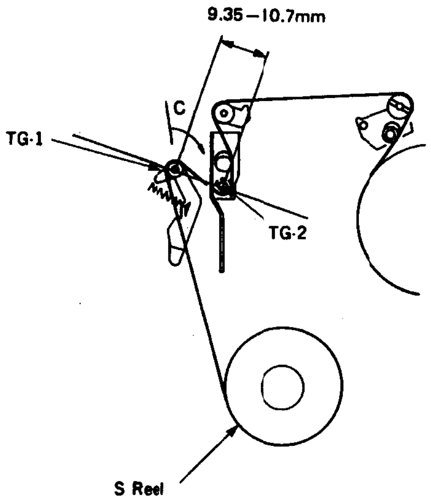
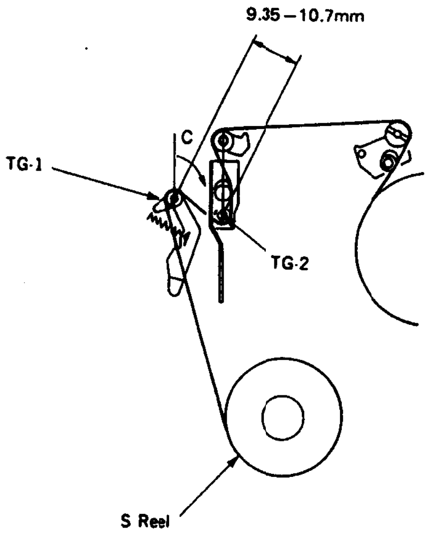

No. 4 Guide (TG-4)
No. 2 Guide
(TG-2)
No. 3 Guide
(TG-3)
No. 5 Guide
(TG-5)
No. 6 Guide
(TG-6)
Tape path
To Drum
No. 11 Guide
(TG-11)
No. 9 Guide (TG-9)
No. 7 Guide
(TG-7)
No. 8 Guide
(TG-8)
Pinch Roller
From Drum
Tape path
No. 10 Guide
(TG-10)

Fig. 64

8mm Video MECHANICAL ADJUSTMENT MANUAL II

Correction Table

As there is an error on page 40, please correct it.

Incorrect	Correct
 9.35−10.7mm C TG-1 TG-2 S Reel	 9.35−10.7mm C TG-1 TG-2 S Reel